THE SCIENCE OF GENERATION

THE ANATOMY, PHYSIOLOGY AND HYGIENE

OF THE

GENERATIVE ORGANS OF THE HUMAN SPECIES OF BOTH SEXES.

FOR THE USE OF PHYSICIANS, STUDENTS, PARENTS, TEACHERS, MARRIED PERSONS, AND THOSE ABOUT TO MARRY.

BY A SPECIALIST ON THE SUBJECT.

"It is time that science, renouncing a reticence which long experience has proved pernicious, should explain and apply to the public good the hygienic laws which pertain to that instinct which, beyond all others, controls the destinies of men for good or evil; we mean the instinct of procreation, the faculty of the transmission of life."—NAPHEYS.

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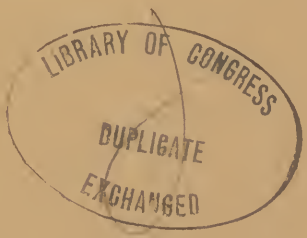

PUBLISHERS' PREFACE.

WE make no apology for introducing this book to the notice of the public. The time was when such an apology might have been thought necessary; when modesty was thought compatible only with ignorance, and any proposition to convey to a young man or woman a knowledge of the true character and functions of the reproductive organs, would have been thought an attack on virtue. Hence, this important field of human knowledge was the possession of the scientific few, and the acquisition of admittedly necessary information was left to chance, and youth imbibed as knowledge the errors and, too often, the vices of their companions, and the indecencies of the unscrupulous quacks who publish advertisements and pamphlets to mislead or corrupt for their own pecuniary gain. But during the last forty years there have appeared certain reliable works treating of various branches of this subject in popular language, notably those of Dr. Frederick Hollick and Dr. George H. Napheys, which have received the unqualified approval of a large number of the leading Physicians, Clergymen, Teachers, and Newspapers of America and Europe. These expressions of approval of such information and of a sense of the importance of the subject will, we think, find an echo in the mind and heart of every lover of his race who peruses the present volume, and we think it will be found to equally merit such approval. Of one or other of those books Professor Harvey L. Byrd, of Washington University, says: "I am one of those who believe the lay members of every intelligent community should be educated in a general knowledge of the laws of life." Dr. John H. Griscom, of New York, says: "The Sanitary Advice so well inculcated, should be learned by every individual, especially by parents for the safety of their children." Rev. Dr. John Todd, the well-known author of "The Student's Manual," says of Dr. Napheys book: "The book cannot fail, I think, to do good, great good, if rightly heeded." Bishop Clark, of Rhode Island, says: "I believe that its general circulation among the young would avert a vast amount of misery and sin." H. Clay Trumbull, the noted Sunday School worker and writer, author of "Teachers and Teaching," says to Dr. Napheys: "Your new

work on "The Transmission of Life" is one that every boy, and every man, every bachelor, parent or teacher, should have and read and be grateful for." Rev. Dr. Horace Bushnell, author of the "Life of Christ," says: "I see it to be a work immensely wanted, and think it will do much good. . . . Give it as great a circulation as you can." Rev. Dr. C. P. Sheldon: "I earnestly recommend its publication and circulation." President Noah Porter, D.D., LL.D., of *Yale College:* "The much needed warnings concerning the offences against Nature, which are practiced in ignorance by many, and with shamelessness by others, are faithfully administered." President Wm. A. Stearns, D.D., LL.D., of *Amherst College:* "The information which you give is of the greatest importance to the community, and especially to young men; and it is a thousand times better that they receive it from a work like yours, than be left to obtain it from sources of doubtful influence, or from bitter experience." President Talbot, D.D., of *Denison University:* "The information imparted is just that which the public most need." President Cyrus Nutt, D.D., of *Indiana State University:* "It contains information of the utmost importance to the individual and the race, and should have a wide circulation." President Stott, of *Franklin College:* "There is certainly great need of such information on the subjects treated." *The Philadelphia Medical and Surgical Reporter:* "The book is intended to meet a want which, during the last year, has been urgently expressed by several medical and literary journals in this country and England, namely, to place before the public, in popular yet irreproachable language, what information regarding the hygiene, nature, uses, and abuses of the procreative function in the male, is necessary to protect the individual from the evil consequences of his own folly or ignorance." *The New York Independent:* "It is, we believe, calculated to do great good." *The American Literary Gazette:* "We are glad to see that able physicians are coming forward to give to the public information on subjects of such interest to every reading man." *The Christian Secretary*, of Hartford: "It is a delicate topic, but one upon which information, properly communicated, is immensely needed by multitudes. . . . Its perusal may save thousands of persons from untold evils." *The Age*, of Philadelphia: "These are topics of vast importance, which are better suited for private reading than for public discussion on the platform or in the columns

of the newspaper. A knowledge of them, however, is essential to health and happiness." *The Christian Radical*, of Pittsburg and New York: "It is a book that should be read. Every man, *and woman, too*, will be the better for it." *The Lutheran Observer*, of Philadelphia: "It is both scientific and practical. Its style is clear and plain, but does not offend the most refined taste. The information it contains is of vital importance to all, but especially to young men, who too often obtain what information they have on the subject from the demoralizing and licentious publications of charlatans." *The Methodist*, of New York: "A thorough treatise on the most important physical function. It furnishes information on a subject on which correct information is much needed, which deeply concerns all men and women and their children." *The Pacific Churchman*, of San Francisco: "It is one of the good signs of the times that such matters are written upon by honest, able hands, and the field not abandoned to quacks. Every young married couple should possess and read it." *The Medical and Surgical Review:* "We are constrained to admit that it is the most extraordinary book that ever came under our notice. Thoroughly scientific enough for deeply-read scholars, or for practical experimenters, it is yet plain and popular enough for the most ordinary understanding. Nowhere else in the English language can there be found such a complete and practically useful compendium of physiological information, strictly adapted for the use of married people, or of those intending to marry. All the new discoveries . . . are given. The engravings are also excellent, as well as curious. In fact, taking it altogether, it is, beyond all question, *the* book upon such matters. One feature which peculiarly distinguishes this book . . . is the peculiar tone of morality and delicacy which pervades it all through, and which makes it *both proper and useful to be read by all persons, of both sexes, who have attained the age of puberty*. A very eminent clergyman authorizes us to say that he deems it a duty to introduce it privately among his flock, as the best means he knows of preventing and overcoming those hateful vices, unfortunately so destructive to soul and body, which are, at the present time, so fearfully prevalent."

The Parent and the Teacher (both Secular and Spiritual) will find in this work much valuable knowledge, for which they have long been seeking, and in a form which will be found to commend

itself to the popular understanding, with a strong moral tone, and couched in the most delicate language; while the physician and student will find *the most reliable and accurate scientific knowledge* on a most important branch of learning, brought down to the latest researches of Hertwig, Van Beneden, and others, in a concise and readable form, the result of many years of study and original investigation by the author.

LONDON, November, 1897.

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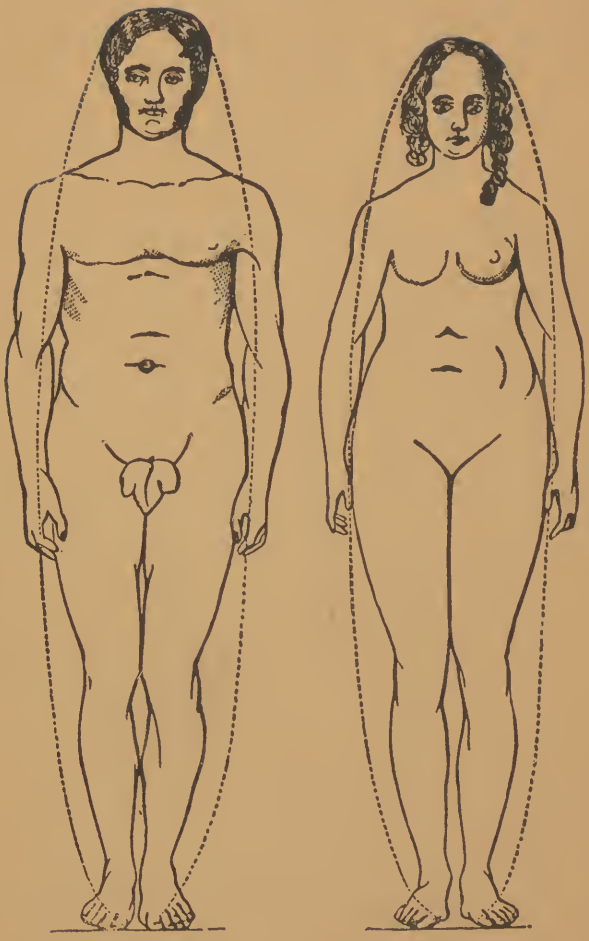


THE MALE AND FEMALE FORMS CONTRASTED.

THE Science of Generation.

CHAPTER I.

PROCREATION, OR HOW YOUNG ARE PRODUCED GENERAL OUTLINE.

A GREAT physician has said, "A woman is a womb with other organs round it." Certainly, though the organs of generation are in themselves distinct from the others, they have in both sexes, but especially in woman, a very strange and mysterious influence upon the whole system, both of body and mind, every part seeming to be in the closest nerve connection with them.

Speaking in general terms the production of young, both in animal and vegetable life, is in effect the same. That is to say, in the physical, made up of all living beings, there are two special substances which are called the sexual principles, or the male and female principles. These two, uniting under certain circumstances, produce a new being, though neither alone has any such power. In mankind these two principles are always formed in separate individuals, which we therefore call male and female persons. The man, the male person, forms within him the male principle, which we call the semen, or seed; the woman forms within her the female principle, called in this case the ovum, or egg. In some lower classes of life these two principles are formed in the one individual, which thus is able to perform both the male and female sexual acts and to produce young. Such beings are called Hermaphrodites. Earthworms, leeches, and many sorts of insects and shell-fish, and most vegetable life, are examples of hermaphrodites.

In the higher orders of beings, no true hermaphrodite is found. But even in these, the modes in which the male and female principles are brought together are very various. For example, in the case of most fishes, the male and female fish do not touch each other at all; the female laying her eggs in the water, and the male, whose sexual desires are roused by the presence of the eggs, deposits his semen upon or near them, and they become fertilized or impregnated. Birds, which are of a higher order of beings, have a kind of imperfect connection, the egg being fertilized within the body of the female. Even in these, as in turtles and some other animals, the egg is only partially developed when it passes from the body to be further developed outside. But in the more perfect animals, as in man, the egg is not only fertilized or impregnated within the body, but remains there to develop into the new being, and the young comes forth alive. In some animals, such as the kangaroo and oppossum, the young are brought forth alive but very imperfectly developed, and the mother at once places them in a pouch, or pocket, adjoining the teats. They receive the teats into their mouths, and holding fast for days or weeks receive their nourishment, and are there developed until able to care for themselves. The young kangaroos, even after they have left the pouch, return to it on any sign of danger, and the mother leaps over the ground and clears bushes, streams and other obstacles, carrying them with her.

From the foregoing outline it will be seen that there must be in each sex an organ or particular part, in which the peculiar sexual substances are formed. This organ or part in the female is called the ovary, or part in which the ova (Latin for eggs) are formed. The presence or absence of this organ is the true test of female sex; with it the animal is female; without it, never. There are usually various other organs pertaining to the ovary. In the human female, and in all females which bring forth their young alive, there is an organ called the uterus or womb, a hollow, muscular, or fleshy organ, into which the ripe egg or ovum passes and remains there for development. In such animals as the kangaroo the womb is very imperfect, and the young pass out at an early stage to have their full development in the outside pouch as already described.

The essential male organ is the testicle, the organ in which

the semen, the special male principle, is formed. The only true test of the male is the testicle. Where this is present the body is male; where it is absent, never. In the human being, as in all the higher animals, there are of course many other organs accessory to these two special ones, all which will be dealt with in proper order.

The human being is the highest order of creation, and in no particular is man's perfection more clearly shown than in the sexual organs, both male and female.

CHAPTER II.

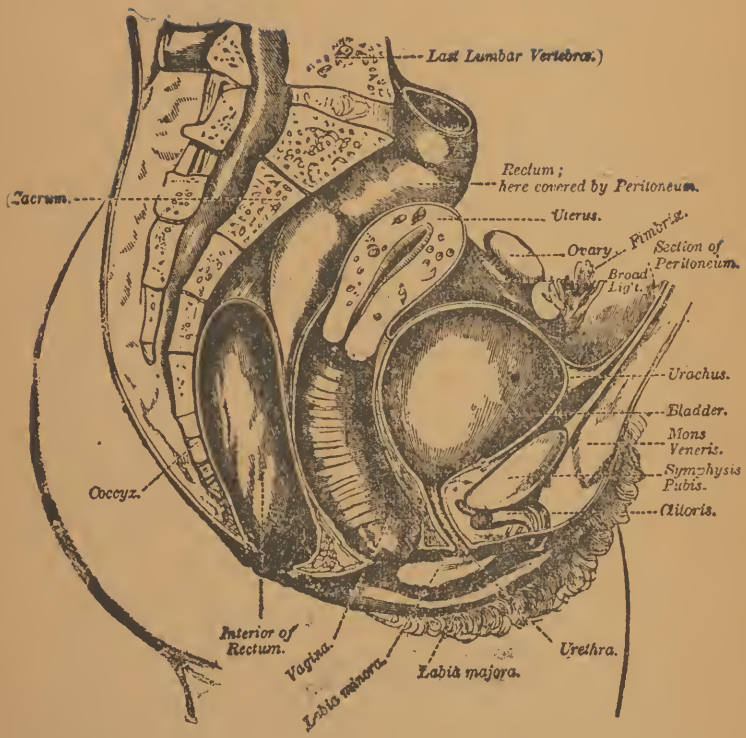
THE GENITAL ORGANS OF THE HUMAN FEMALE—EXTERNAL.

THE external parts of the female genitals are not of themselves directly concerned in the production of the new being, but as their form and size may indicate the character and condition of the inner parts, and also because it will be necessary to refer to them, it is well here to describe them.

At the lower extremity of the abdomen or belly is situated the Pubic bone. At this point, especially after the female approaches young womanhood, the forward arch of this bone is covered with a thick layer of fatty flesh, which makes there quite a little mound or prominence. This prominence, which is called the Mons Veneris, or Mount of Love, is also after that age covered more or less with hair, called Tressoria or Pubes. The absence of this covering of hair was in former days regarded as a disgrace, or at least a misfortune. Indeed, in the days of our rude forefathers, the law provided that if a woman were the third time found in illicit intercourse, this hair should be cut off. This seems to have been intended as a hint that she should restrain her sexual passion, for it is seldom absent except in those women in whom sexuality is very low or altogether wanting, as in those who have no ovaries. It seems, generally speaking, to be a badge of sexuality, for if the ovaries be removed by the surgeon, as they sometimes are when diseased, this hair gradually falls out and disappears. Certain diseases also cause it to fall out, as do also some powerful drugs. In some persons it grows to such an extent as to become troublesome.

The Mons Veneris and its covering of hair generally appear at the age of puberty, that is, the age at which the child becomes the young woman. In some persons the development of both is so rapid that a few weeks will greatly change the appearance of the body in that respect. Many think the coming of this hair a sure sign of womanhood, and some physicians are even guided in their treatment of the young person by this supposition; but this sign is not always to be trusted, as cases have been known in which girls of nine or ten years of age had the Mons Veneris and

PLATE I



SECTIONAL VIEW OF THE FEMALE ORGANS OF GENERATION.

The terms used will be found sufficiently explained in Chapters II. and III.

its hairy covering both largely developed, but who did not menstruate (see chapter v.) till some years later, while in others the hair does not make its appearance for several years after menstruation has begun; in some women it scarcely can be said to appear at all, while Dr. Hollick mentions the case of a child of four years on whom was a large growth. Usually, however, it is a pretty sure sign of puberty, as the dawn of womanhood is called.

Just below the Mons Veneris are two pairs of large lips, an inner and an outer pair, called the Labia Pudendi (Latin—Lips of the Privates). The outer ones, called Labia Majora (Latin—Larger Lips), extend from the Mons Veneris, underneath the abdomen to within about an inch and a half of the anus. They are formed, as the lips of the mouth are, by ordinary skin on the outward side and mucous membrane within, and are made plump and full by a thick deposit of fatty matter in them. The outward surface of these external lips, like the Mons Veneris, is covered with the Tressoria, which continues from the Mons, more or less, to their lower extremity.

The mucous membrane of the inner side is dotted with many little glands, which secrete a clear, thickish fluid, with an odor peculiar to itself. These lips are united at their upper and lower ends, but in the middle they are entirely separate (though usually touching, or almost touching each other), and in the middle they are the largest and most prominent. In some persons they are large, full and elastic; but in others they are small, thin and inelastic, which makes them liable to injury during childbirth.

In some young persons they have been known to grow together, on healing, after inflammation. In such cases they should be separated before marriage, which may be easily done by a physician or surgeon; otherwise their condition may occasion great distress and injury.

In virgins the inner surface of these lips is pink, but after intercourse it becomes slightly tinged with violet or brown. It is not always just, however, to conclude from the changes in color that intercourse has taken place, as the change sometimes arises from other causes. After marriage also these lips become less firm, and hang lower and farther apart.

Lying just within the two outer lips are the two inner ones, sometimes called the Labia Minora (Latin—Smaller Lips), but

more commonly called the Nymphæ (Latin—Brides). These Nymphæ do not reach so far either up or down as the Labia Majora; and being also smaller and thinner are usually completely hidden by them. In young children, however, the Nymphæ frequently project farther out than the external lips, which latter, becoming full and round after puberty, close together and conceal them; but after childbirth and in the latest stages of pregnancy they may again appear. In some females, particularly in Asiatic countries, the Nymphæ grow to a great size, partly closing the passage to the womb. Their size, then, subjects them to much irritation from the clothing and from the adjacent parts; and being a part in which much sexual sensitiveness lies, this irritation sometimes causes intense sexual desire, not seldom amounting to mania, the unfortunate woman being irresistibly driven to seek gratification in some way regardless of consequences. In such cases they should be removed by a surgeon, which may be done very easily and without any danger whatever. This operation, like circumcision of the men, is quite common in many Eastern countries, where this enlargement of the Nymphæ is very usual. Often these Mohammedans cut away the Nymphæ from their young girls to make them have less sexual feeling, so that they may be content with their small share of the much-divided attentions of their many-wived husbands.

Sonnini says that in his time, in many Egyptian cities, men, whose trade was the removal of the Nymphæ in young girls, went about the streets, in a loud voice, soliciting custom and crying, "Here's a good circumciser." Of still more ancient times we are told by the traveller, Leo Africanus, that these circumcisers called out, "Who is she that wishes to be cut?" These surgeon specialists, in their way, used only a razor to perform the operation, and they stanched the flow of blood with a little ashes. Another reason for this removal may be, as in the case of circumcision in man, a regard to cleanliness, the secretions accumulating under them when large, and causing great irritation. Dr. Remondino, in his work on circumcision, asserts that in Egypt and in some other Oriental lands, it is not unusual for a jealous-minded husband to fasten these Nymphæ together, in his wife or concubine, with a little padlock, of which he only holds the key, so as to thoroughly assure himself that she would not have intercourse with other men.

In some women, especially amongst the Hottentots of South Africa, the upper part of these Nymphæ, where they join, is greatly enlarged, so as to hang down in front of the opening like a great flap, sometimes three, four, five, or even nine inches long. The Hottentots are a very low class of humanity, and in their sexual organs, as in their other physical character and in their low physical development, are much nearer the brute creation than the average human being. In their women the Mons Veneris is less developed than in white women, the outer Labia Pudendæ being much smaller, and the opening much larger and farther back, as in beasts.

It is highly important that the young female should know, previous to marriage, whether these external organs are all apparently normal, and if she have any doubt she should consult some discreet married woman, or her physician. These labia may be too large, or acutely sensitive, or grown together, or ulcerated; and if these troubles and difficulties be only first discovered in marriage bed, great distress, unhappiness, or injury may result, while the trouble could have been readily removed beforehand, if known.

Just within the round, projecting, upper arch, where the two Nymphæ join, is a small organ called the Clitoris. It is of a firm erectile tissue, and about the size of a large pea, but extending a little way inwards. This remarkable organ resembles the male penis in some respects. It is the chief seat of sexual sensitiveness, and, on excitement of passion, becomes erect and firm. It is, like the penis, of a spongy substance, and on excitement the blood cavities become pressed full of blood, causing the body of the organ to erect itself. This sensitiveness to sexual sensation seems, indeed, to be its chief characteristic, and suggests its use, namely, to promote a similar excitement in the internal generative organs and thus assist them to perform their functions. Where it is too much developed, or too sensitive, it often produces the same mad desire of intercourse described in the case of the Nymphæ, and leads to acts suggesting utter and shameless abandonment Whenever it comes in contact with the adjacent parts, and is rubbed by them or by the clothes in walking, it becomes engorged with blood, erect and excited, and in turn excites the womb and other organs, producing a perfect frenzy of sexual desire, in spite of all her

efforts to repress it, the unfortunate female being looked upon as thoroughly immoral, while the true cause of her shocking conduct may lie in a mania caused by the condition of the Clitoris, and is no more controllable by the will than is the hunger of an empty stomach. Mothers, or others having the care of young girls, should carefully see to it that no such unfortunate physical condition shall lead to their ruin and degradation, but that proper medical or surgical remedies are adopted in time. Good moral training is very proper and necessary, but in a case of this sort the advice of a prudent physician should be had. The old law prescribed what was at once a punishment and a cure for this sort of conduct; by it a woman, detected for the fourth time in unlawful intercourse, was sentenced to have the Clitoris amputated in open court. It does not appear that our good forefathers were so careful to correct the behaviour of her paramour, the male partner in guilt, as to remove the offending member from him.

Cleanliness of the parts and careful avoidance of rich and stimulating food or drink will do much to allay any undue excitability of the Clitoris, or of the Nymphæ. Bathing in water as hot as can be borne also gives excellent results. Sometimes this unnatural sensitiveness exists at a very early age, and the child is led to frequently handle the parts. This only increases the excitability and begets a very vicious and dangerous habit. It is not a case for scolding the child, but for proper physical remedies, and if attention to cleanliness and diet do not effect a cure, a physician should be consulted. If the Clitoris be too large, and so liable to be irritated and excited, it can be readily amputated by a surgeon without danger and with good results. On the other hand, where it is so small that it does not properly perform its function of rousing the other organs of generation at the proper time, means may be, and in cases of barrenness sometimes are, adopted to cause it to increase in size and in sensitiveness.

Both the Clitoris and the Nymphæ are very liable to irritation in bicycle riding. The saddle, if not of a pattern properly calculated to avoid it, causes the clothing to rub on those parts, producing great sexual excitement, in some cases one orgasm (or period of intense passion in the genital organs) following another in quick succession. This is exceedingly injurious to the nervous system, to say nothing of the ovious moral danger, and unless a saddle is

used which will not produce this effect, a woman, younger or older, and no matter how badly she may require exercise, had infinitely better not ride at all. Saddles are now to be had on which the rider rests on two pads, one each side the middle, the part which goes between the limbs to steady the rider being much lower down, thus avoiding the rubbing and consequent sexual irritation. Parents should see to it that the bicycle saddles on which their daughters ride are properly made in this regard, lest what should be a delightful and healthful recreation should be found instead a moral and physical curse.

The Clitoris is much larger, relatively, in very young children than in adults. Indeed, in the case of the child some months before its birth it is so much like the penis that it is difficult to distinguish the sex. Even some adult females have the Clitoris so large that it much resembles the male penis, and can be used in the same way to have intercourse with other females. Dr. ——— tells of such a person who passed as a woman, wore woman's clothes and married a man, but after some years left him, donned male attire and married a woman. The poor creature had apparently the sexual appetites of a male, but the genital organs, though thus deformed, and in other respects very imperfectly developed, were really those of a female.

The Clitoris is present in most of the mammalia of milk-giving animals, even in the marine mammalia, such as the whale and porpoise. In most carnivorous animals, and in many others, such as the ape, the rat and the rabbit, it is relatively very large; and in some, as the raccoon, the bear and the otter, it contains a small bone. In the kangaroo and oppossum the Clitoris is divided or split, like the extremity of the penis in the male of those animals. The Clitoris of the female spider monkey is three or four inches long, and much like a penis; it has a sort of exterior urethra or passage for the urine, in the shape of a groove, down which the urine flows, and also a prepuce or circular foreskin, as on the penis. In the Lemming, a kind of field-mouse, there is even an interior urethra, or passage for the urine, as in the male penis. Glands similar to those under the foreskin of the male are often found much developed in the females of the lower animals; these preputial glands, as they are called, often emit a strong and disagreeable odor. No animal except the human female has the Mons

Veneris, the Tressoria or hairy covering, or the Nymphæ or inner lips, except perhaps rudimentary, and the external lips are thin and weak. In the lower animals the mouth of the vagina, or passage to the womb, is round, not oval, as in the human female, and is set somewhat farther back, or nearer to the anus. In the mare and in a few other animals there is a small tube, or vaginal canal, as it is called, on each side of the vagina, the purpose of which is unknown.

The outer opening of the vagina, between the Labia, or lips, is called the Vulva or Fossa Magna (Latin—Great Trench). It also varies a good deal in different persons. In white females it is more in front than in colored persons; also the vagina is shorter and smaller, the outer Labia, or lips, fuller and firmer, the Clitoris smaller, and the Tressoria less abundant in the white woman than in her colored sister. The Vulva, or opening into the vagina, is at the lower or rear end of the Labia, or lips, and just above their lower point of union. This point of union is called the fourchette, or fork. The space between it and the anus is called the Perineum, and the space between the upper edge of the vulva and the clitoris is called the Vestibulum (Latin—Vestibule). In the middle of this space is the mouth of the Urethra, or duct, by which the urine is passed out from the bladder. This urinary passage, it will be seen, is quite distinct from the passage which leads to the womb.

In virgins the vulva just mentioned, is usually nearly closed by a membrane, or sort of skin, called the Hymen (Latin—Wedding, or God of Marriage). This must, of course, be broken on the first sexual congress. It is a very common but mistaken supposition that the presence of this is a sure sign of true virginity, and its absence, of sexual intercourse having taken place. In many females it never exists at all, even in childhood; in many others it is very delicate and easily destroyed in various quite honest ways. Sometimes, where the opening is very small or absent, the Hymen is ruptured by the flow of the monthly courses; sometimes it is torn asunder by falls, or by spreading the legs wide apart. For this reason the Jewish maidens in Isaiah's time walked with a very short, mincing step, affecting a great care for the safety of this token of virginity, though really soliciting men all the while, and much to the disgust of the old prophet (Isaiah iii., 16), who had no faith in their affectation of purity. Sometimes, also, long-

continued and debilitating diseases will either cause the Hymen to disappear entirely, or to become so relaxed that it is not noticed. Also, in some persons, the membrane is so thin and delicate that it may be destroyed by the rough use of a towel in bathing, or by having the napkin, used to absorb the menstrual flow, too tightly bound against the person. Certain vicious or improper practices by even children will destroy it in themselves, as will also various necessary examinations or operations by the physician or surgeon. For all these reasons, women who marry late in life seldom have any trace of it by that time, though they have been perfectly chaste and continent, for very few wholly escape those diseases and accidents mentioned. It is therefore obvious that the old Jewish custom (Deuteronomy xxii., 13-22), which tested a bride's virginity by the presence, or absence, of blood from the newly ruptured Hymen on the sheets of her wedding bed, must have often proved most unjust and cruel. Further, though when a perfect Hymen is ruptured, more or less blood usually flows, yet this is not always the case, and there may be some flow of blood caused by disproportion in the male and female parts, though the Hymen is entirely wanting. In some persons, too, the Hymen, though at times so relaxed as to permit intercourse without breaking it, becomes again contracted and tense, so that even a widow, on a second marriage, may exhibit this sign of virginity. This apparently virgin condition can, and has been sometimes produced by artificial means, so that a woman who has even borne a child may appear as if she had never had intercourse. It will be seen, then, that though the Hymen is usually present, and causes more or less pain and difficulty in the first act of copulation, yet where that does not occur till after the twentieth year, there is seldom much of either.

The menstrual flow escapes through a small opening through the lower side of the Hymen; sometimes, however, there is no such opening, the Hymen completely closing the vulva, and the menses are so retained within the vagina, not seldom, as can well be imagined, causing disease, insanity, or even death. Yet the remedy is very simple, merely to puncture the Hymen and allowing the menses free passage. This is a very easy and safe operation, but should be done only by a physician or surgeon.

Some cases have been known in which the Hymen was so

thick and strong that the marriage could not be consummated until the Hymen was slit by the surgeon's knife, and the opening then, if required, stretched larger by proper instruments. Dr. Hollick mentions a case in which the membrane had become apparently partially ossified or bony, and had to be cut away. The remains of the Hymen usually become gradually absorbed, but often vestiges of it remain like little pimples, called sarunclæ myrtiforma, round the mouth of the vagina, and these are very sensitive.

Some of the lower animals, such as the mare, the cow and the ape have, previous to their first connection with the male, a sort of imperfect Hymen, which partially closes the entrance to the Vagina.

PLATE II.

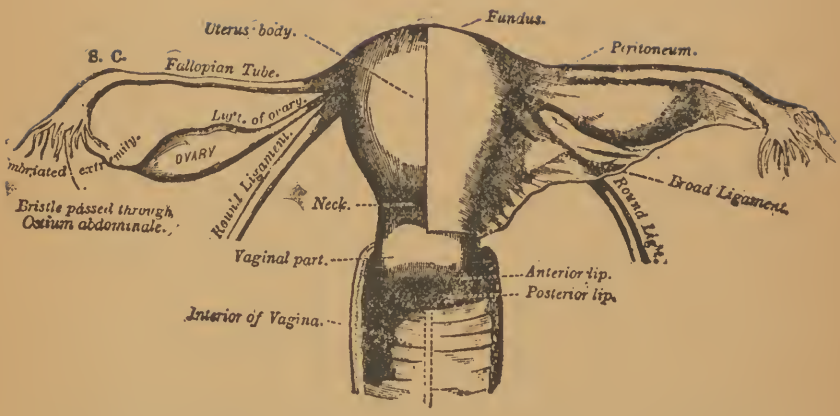


DIAGRAM SHOWING THE RELATIVE SIZE AND POSITION OF THE UTERUS OR WOMB, AND ITS APPENDAGES

The terms used will be found sufficiently explained in Chapter III.

CHAPTER III.

THE FEMALE GENITAL ORGANS—INTERNAL.

Ovaries—Fallopian Tubes—Womb—Its Ligaments—Vagina.

THE OVARIES.

THE importance which Nature attaches to its reproductive system is illustrated by the fact that the ovaries, as the testicles in the male, are among the first organs formed after conception, the little protoplasmic cells beginning to rush about and arrange and form themselves into these organs within a few hours after the egg is impregnated by the semen of the male.

The Ovaries, as stated in Chapter I., are the essential organs of female sex. In the human female, as in all the higher orders of life, they are two in number, one on each side of the pelvis, or arch of bone, on which the body rests, just within the lower edge of the hip bone and quite close to the surface of the abdomen. In size and shape they much resemble the testicles of the male, but flatter, say about the size and shape of the egg of a Bantam fowl, slightly flattened from side to side; they are smooth externally in the child, as are the testicles. After menstruation they become rough and uneven and covered with little hills and hollows. They are quite small in childhood, but on the dawn of womanhood (puberty), usually at about twelve to sixteen years of age, they begin to enlarge and develop, and to exert a strong influence over the whole system.

In former times, physiologists, not knowing the true purpose of the Ovaries, called them the female testes, wrongfully supposing that they secreted something like the male semen. This idea was quite erroneous; their function is to produce the germs or cells, called the Ova, or Eggs, as mentioned in Chapter I., in which, when fertilized by the male semen, all living beings have their origin. In each Ovary there are contained a great many thousand vesicles or little cells, imbedded in the substance of its outer zone, called the Graafian Vesicles, varying in size from the size of a small pea to so small a size as to be invisible to the naked eye, and in various successive stages of development. After puberty there are

usually twenty or thirty of these at once large enough to be easily discoverable. It is supposed that all these vesicles, or cells, exist in a rudimentary form at the time of the child's birth, or earlier, but so small then as to be undiscoverable even with a microscope. They develop very slowly until the age of puberty, when their rapid development causes the increase in the size of the ovaries which contain them, as above mentioned. Each vesicle or cell contains one ovum or egg. The development of the egg corresponds, of course, to that of the cell which contains it. One of these vesicles, with its egg in it, is usually more advanced than the others in the ovary, and commencing at the period of puberty they all ripen or mature in succession until the change of life, at about forty to fifty years of age, when usually all have been matured, or have atrophied and shrunken away. They usually develop in regular succession, beginning with those next the outside of the ovary, and those farther in gradually working to the outside, until all have been matured. Sometimes, however, some of them are very much later in developing than the rest, and years after the change of life had passed, or was supposed to have passed, the woman begins again to menstruate and even to bear children, even at the age of sixty or seventy years. After all the eggs have been matured and passed out, or have died and shrunken away, the ovaries gradually shrink and waste away, and in some cases almost disappear. Usually a good number of these vesicles in the ovary appear alike, but one is actually more mature than the others, and, in its turn, completes its development quite rapidly and is ready to be passed out. As soon as the Graafian Vesicle, with its enclosed egg, is ripe, it bursts in the manner which I shall describe later, and the egg escapes and is expelled from the ovary and finds its way to the womb, where it remains for a short time. If after its expulsion from the ovary it be impregnated by the semen of the male, it lodges and remains in the womb and develops into the new being; but being only one of the two generative principles, if not so impregnated it can develop no further, but passes out of the body and is lost. In most females, both married and virgin, this ripening and expulsion of an egg occurs about once a month, from puberty to change of life, the egg beginning its course from the ovary to the womb about the time the monthly flow ceases, and, it will be observed, this develop-

ment of the egg takes place quite independently of sexual excitement or association.

In all animal female life this same periodical development of an ovum, or egg, takes place in some form. Thus it is well known to poulterers and bird keepers that female birds will begin to lay their eggs, and continue to do so, without having ever had any intercourse with a male. Many a maiden lady, unacquainted with this fact, has been dreadfully shocked to find in the cage of her favorite canary, or mocking bird, which she supposed (and which was in fact) virgin, a bright new-laid egg. The eggs so produced, not having been impregnated by the semen of the male, are of course unfruitful and cannot be hatched.

There is great diversity in the frequency with which this periodical development and ovulation, or egg-laying, takes place. The common barnyard hen usually matures and expels one egg each day, some birds are oftener, others less often. The human female, as we have observed, matures one about every twenty-six or twenty-eight days. Horses, cattle, sheep, etc., ripen one (sometimes two) several times a year. Dogs, cats, rabbits, pigs, and other animals which bring forth in litters, mature a number of these eggs at a time and several times in a year, while others, the lion and elephant for example, bring only one egg to maturity in two or three years. As it is only when the ripened egg escapes from the ovary and is on its way to the womb, that it can be impregnated, it follows that in all these animals there are only certain periods, more or less frequent, when conception can take place. If the male semen be not at that period brought into contact with the egg, it is expelled from the body and no conception can occur until the next period comes round and another ovum is expelled. In the lower animals, as a general rule, intercourse is only desired by the female at that time, but the desire is then very strong. The sexual or amorous desire which is then so noticeable in them is caused by the irritated and inflamed condition of the internal genital organs which always attends the ripening and passage of the egg down through the Fallopian Tubes from the ovary to the womb. The animal in this condition is said to be in Heat, Rutting, Running, in Season, etc. This period is scientifically called the Œstrum (Latin—frenzy or fervor). During this season only does the female have any desire for association with the male, and then

only could she conceive young, even if connection should take place, because at that time alone is there an ovum or egg ready to be impregnated by the semen. In some animals, as in the cow and horse, this rutting season seldom occurs except in spring and summer, a wise provision of nature which secures the birth of the young in the spring, so that the warm air and green herbage of summer may fit its tender frame for the rigors of winter. In the human female, however, the regular successive monthly development of the ova or eggs proceeds without cessation during the whole year, and conception may, therefore, take place at any time of the year; the spring, however, seems to have a somewhat stimulating effect upon the male generative faculty, and for this reason conception more frequently occurs at that season than at any other. During only a part of each month, however, can she conceive, namely, while a ripened egg is on its way from the ovary to the vagina. Some difference of opinion exists as to the place in which impregnation of the egg by the male semen takes place. Hollick contends that it can only occur while the egg is in the womb, and that the semen never penetrates further. Playfair, however, following the now generally received opinion, thinks that it usually occurs in the Fallopian Tube, and sometimes in the womb, abdominal cavity, or even in the ovary itself. After one ripened egg has left the womb and before the next has left the ovary, she cannot possibly conceive.

In the human female, as in the lower animals, a good deal of heat, or inflammation of the generative organs, accompanied by a free discharge of a rather dark brownish fluid, composed of blood and mucous, occurs at this time. This discharge is called the Menses (Latin—Months, Menstrualis—Monthly), Menstrual or Monthly Flow, Monthly Courses, Catamenia, etc. In the lower animals, during the period of the rut or heat, there is a somewhat similar discharge, but it is less noticeable because usually it is relatively less abundant and almost colorless. In the human female the sexual desire is often much stronger and more readily excited then than at other times, but it is generally by no means confined to that period.

The following is the manner in which the egg escapes from its containing cell, is expelled from the ovary and passed into the womb. About three weeks before the monthly flow the larger Graafian Vesicles, or egg cells appear pretty much alike, but

about a week later one of them becomes larger than the others, and begins to have a slight swelling or prominence on the side next the exterior of the ovary in which it is imbedded. This swelling becomes, just before the monthly period, like a little pointed pimple, ready to burst; presently it does burst at that point, and the egg, which is about the size of a pin point, escapes through the opening so made and is ready to be transmitted to the womb. This escape of the egg from the Graafian Vesicle, or cell, is called the ovulation. To properly understand the following explanation of the passage of the egg from the ovary to the womb, it will be well to look at Plate IV. Each ovary, it will be seen, is connected with the womb by a short, firm cord, or ligament. Just above this ligament is a tube, called the Fallopian Tube. It is much longer than the ligament. At one end it opens into the upper cavity of the womb, and at the other end, which is much larger (about half an inch in diameter) and trumpet-shaped, it is open. At this end it terminates in a number of fringes like little fingers. They are called the fimbriæ of the tube, and their use will be shown presently. Down this tube, which extends thus from the ovary to the womb, the egg is to pass. When the little speck, called the egg, is about to escape from its containing cell, these little finger-like fimbriæ, at the entrance to the fallopian, clasp the ovary and press the mouth of the tube over the spot in the outside membrane of the ovary where the Graafian Vesicle is about to burst. It seems probable, also, that the cavity of the trumpet-shaped end of the tube contracts, then expands by the vigor of its erection, creating a partial vacuum and assisting the rupture of the Graafian Vesicle. Possibly, also, the muscular fibres of the ovary may assist in pressing the vesicle to a rupture. In this tube are numberless little hair-like projections called Cilia, which are in constant motion and which slant towards the womb end of the tube, allowing the egg to pass freely in that direction, but preventing any return; the walls of the tube also contract behind the egg and force it along, as the hand forces the milk from the cow's teat in milking. This process is, however, very slow, the egg taking from two to six days to pass from the ovary to the womb. As the monthly flow usually lasts for several days or a week, and the egg does not leave the ovary until about the time the flow ceases, or sometimes for two or three days after, it follows that the egg does not reach the womb till about

two days, or sometimes four or five days after the flow is quite over.

Dr. Hollick says that when it reaches the womb end of the tube it does not pass immediately out into the womb, but its progress is there stayed for a time by a very thin membrane, called the Decidua (Latin—that falls off), which lines the womb. This membrane is formed each month during the flow, and, unless conception takes place, each month it falls off and comes away. The egg, thrust out of the Fallopian Tube, crowds on this membrane and lies in the little hollow place thus formed. There it remains for a period, varying in different persons from two to six days, when the Decidua, or temporary lining membrane, loosens from the womb and passes out, carrying the egg with it. During the period when the egg remains thus in the womb, conception can take place, not before nor after. It is true, that though the coition with the male be had even a few days previous to the time when the egg reaches the womb, conception may still occur, for the semen can and may live in the vagina and womb for several days and then impregnate the egg on its arrival, conception then taking place from that intercourse, but some hours or days later. If the egg be so impregnated, neither it nor the Decidua is expelled, but the egg attaches itself to the walls of the womb, where it develops into the child, and the Decidua, enlarging with the expansion of the womb, and growing thicker and stronger, forms one of the membranes which enwrap the fœtus, or unborn child. Dr. Playfair, and most late physiologists, hold a different view, believing that the ovum is impregnated usually in the Fallopian Tube, and that, if not so impregnated, it is usually broken and destroyed before reaching the womb. But if impregnated by the male semen, it lodges in the highest part of the womb, where the Decidua vera, or true lining membrane of the womb, sends out sprouts which envelop the egg and form one of the layers around the fœtus. While the new being is thus occupying the womb, and, indeed, after its birth and while nursing, no more of the ova are developed, all the energy of the Generative organs being bent to the development of the fœtus. Unless the egg remains in the Ovary until it is expelled in the natural way, it is imperfectly developed and cannot be impregnated. Therefore an egg taken from the ovary artificially, cannot be impregnated with the male semen, while one, which has naturally left the ovary, and has been taken artificially from the Fallopian Tube or the womb, is perfect and can be so fertilized.

Usually, only one of the Graafian Vesicles, or egg-containing cells, is matured each monthly period, and each contains one egg. Sometimes, however, both ovaries act and each matures an egg in the same month, or one ovary may possibly mature two Vesicles, or one Vesicle may contain two eggs, so that two or more of these ova or eggs may, and sometimes do, descend into the womb after one monthly period. In that case, the two, or three, or four, or more ova may be impregnated, and twins, triplets, or quadruplets may be the result. This is the case in those lower animals which usually produce a number of young at a birth, as dogs, cats, rabbits, pigs, etc.

As before stated, the presence of the ovary is the one distinguishing feature of the female sex, it appearing even in those minute animalculæ which are much too small to be seen by the naked eye, and in some creatures, such as the spider, the queen bee and the ant, the ovary, when full of eggs, is often larger than the rest of the body. In some very prolific beings, too, the ovary contains an enormous number of eggs, as many as ten millions being contained at once in the ovary of a single female sturgeon. Most insects die as soon as they have deposited all their eggs, this being the last act of the perfected female insect, as in some cases also, the impregnation of the female is the last act of the male.

The cause of the rupture of the Graafian Vesicle, or cell, permitting the escape of the egg, is its engorgement with blood. The cell is surrounded by several membranes, the inner one being filled with a whitish transparent fluid. Between this inner layer and that next to it, is the egg. This second membrane contains a great many very small blood vessels, which, about three weeks before the monthly flow, become very full of blood. This fulness increases to such an extent that some of them are ruptured, and the blood oozes into the space where the egg lies. This causes the egg to float up to the top of the vesicle. Gradually, too, the blood oozes also into the inner cell, taking the place of the whitish fluid before mentioned. This effusion of blood eventually increases to such an extent, that the whole vesicle is burst open by it on the outside of the ovary, as a boil might break, and the egg escapes as before described. The blood is taken up by the Fallopian Tube and first passes to the womb, its presence everywhere possibly setting up that irritation which causes the Menstrual Flow. The

egg is about 1-120 of an inch in diameter, and appears like a little ball of bluish colored starch, just large enough to be visible.

The spot where the Graafian Vesicle was ruptured, remains on the surface of the ovary as an inflamed spot, with the minute rent in the centre, for some time. After a time, the inflammation goes down, and the spot remains as a yellowish brown scar on the ovary, the empty vesicle having shrunken away and disappeared. This scar is called the Corpus Luteum (Latin—Yellow Body; plural, Corpora Lutea). Until about forty years ago, it was thought by the anatomists to be the result of conception, and that it only existed in those persons who had borne children, and it sometimes happened that medical men, believing this, testified that an unmarried woman, whose body they had dissected in post mortem examination, had not been virtuous, the presence of corpora lutea indicating, to their minds, that she had borne children; the unfortunate woman thus had her character villified after death, with the result, perhaps, that a scoundrel, charged with seducing her, escaped scot free, on the ground that she was not previously virtuous.

The celebrated case of Miss Angus, of Liverpool, who died in 1808, is a case in point. The circumstances surrounding her death were such, that suspicions were aroused that she had been the victim of foul play, and that her master was concerned in her taking off. On examination of the ovaries a perfect Corpus Luteum was found, and the anatomists declared that she must therefore have become a mother. It is now well known, however, that these Corpora Lutea are the ordinary monthly product of the ovulation or egg-laying, the production and expulsion of the egg, and that the scar left by the escape of the egg, which, becoming impregnated in the womb, develops into the new being, is in no way different in kind, but only in degree, from the scar, or Corpus Luteum, left by the egg, which escaped the previous or any other month.

The Corpus Luteum left by the ovum of pregnancy, however, does not disappear quickly as does that left by the ovulation, which does not result in pregnancy. When conception occurs, the ovaries become considerably enlarged, and the scar called the Corpus Luteum enlarges with it; just as a three-inch brand put on a calf or colt, becomes a six, or eight, or ten-inch scar on the grown

steer or horse. Moreover, the vigor of the system is, in the case of pregnancy, so much directed towards developing the embryo child, that the wound on the ovary is not so quickly filled in and healed. In fact, it keeps enlarging until about the fourth month of pregnancy, when it gradually lessens, and nearly, or sometimes, quite disappears, except for a slight depression which it leaves.

It does not follow, then, that there are at one time as many of these scars on the surface of the ovary as the female has had of menstrual periods, for the scars gradually fade away and disappear, so that seldom can more than three or four be seen at one time, though traces of a larger number may sometimes be detected with the aid of a microscope. During the later years of menstruation, too, they fade away more slowly, just as scars on any part of the body are less likely to disappear in adults than in children, the body tissues changing more slowly. The fallacy of the contention that the number of pregnancies a female has had can be told by counting the Corpora Lutea on the ovaries, is well shown by the fact, that four or five have been found on the ovaries of a young woman of fifteen or sixteen years of age.

Where the ova are not formed at all, of course the female is barren. Also, where the ova are imperfectly developed, as is sometimes the case where the ovaries are weak or diseased, conception is very unlikely to take place, the life germ in the egg being too weak to be impregnated. And in such cases, even if the female do conceive, she is very likely to miscarry, or the child may be deformed. Sometimes a woman whose ovaries are constitutionally weak or diseased will bear several deformed children, but on having the ovaries strengthened or cured by appropriate treatment, she will produce healthy and perfect offspring. Similarly, disease or imperfection in the male, may be the cause of imperfect semen, and the imperfect animalculæ of the semen may, even with perfect ova, be the cause of constitutional weakness or deformity in the fœtus and in the child.

It has been supposed by some physiologists that the male semen sometimes penetrates the ovary of the female and impregnates the egg there, and cases are cited in which partially formed fœtuses have been found in the ovary. Careful investigation, however, shows that this imperfect development is just as often found in the ovary of a female who has never had intercourse with a

man, even in children, as in that of a married woman. The fact seems to be, that under some peculiar conditions, a certain unarranged development of the mere bodily organs, without nerves or organization, may take place in the egg itself without the male semen. A case is cited by Hufeland of a girl of thirteen, in a diseased sac, in one of whose ovaries was found the rudiments of an imperfect fœtus, and it is not very unusual to find detached parts, as single limbs, teeth, bones, hair, etc., as if the ovary, while able to form these parts in an imperfect way, could not perfect or even arrange them without the directing nerve force of the seminal animalcule. Haller claims to have distinctly observed the outline of the form of a chick in a hen's egg which had never been impregnated, and the same circumstance has been noticed in the eggs of some amphibious animals. Indeed, it is more than probable, that there exists in every egg from the beginning, in some form, visible or invisible, the outline of the being into which it may in future develop, just as in the acorn may be found the semblance of the future oak. It is well, then, to bear in mind, that the finding of such a remarkable development is no evidence that the female is or was other than absolutely chaste and virtuous. There is a wide difference of opinion on the question whether the seminal animalculæ do ever reach and impregnate the egg before it leaves the ovary.

In those females in whom the deficient action of the ovaries is due to the coldness and torpidity of the Generative Organs, it often occurs, that the production of sexual excitement in them will remedy the defect and cause a better and more regular development of the ova, and for this reason, marriage is often recommended as a cure. The converse is also true, namely, that too much sexual excitement stimulates the ovaries to a too frequent development of the ova. Cases have been known of married women in whom the frequent artificial production of amative excitement cured the imperfect development so that upon subsequent intercourse with the husband, conception resulted though all other means had failed.

Living on rich and stimulating food often lessens the power of generation in both sexes, by the too active formation of flesh and fat, while on the other hand, a poor diet impairs the Generative Power by insufficiently supplying the ovaries, in common with

the other organs of the body, with nutrition. At the same time, there are in human beings so many other factors entering into that passion, which we call Love that the circumstances of Diet and surroundings may be quite overcome by others of an opposite tendency. In the lower animals, the amative impulse is called forth by only one cause, the physical condition. Thus it is seen that in their wild state, when their food and warmth are often insufficient, their Rut, or Heat, usually occurs at only certain seasons, but when their surroundings become more genial, the same animals, when domesticated and properly housed and fed, will experience this condition and be liable to conception more or less frequently throughout the year.

With human beings, on the other hand, the sexual instincts are awakened by a variety of circumstances, besides mere physical impulse, such as the social manners and customs, the influence of the imagination aroused by some sorts of reading, pictures, etc., the freedom of intercourse, moral and intellectual adaptations and admiration, and various other causes, so that the physical condition plays a much less important part with them than with the lower animals. For this reason, it is often seen that those classes of people who live in the most abject wretchedness, produce children with the most alarming rapidity, the reason being that, being deterred by no considerations of prudence or of means of supporting the prospective new-comer, which considerations they leave entirely to Providence, or to the Overseers of the Poor, they marry early, and abandon themselves without restraint to their sexual impulses, and indulge themselves without restraint in the only pleasure that poverty leaves to them as well as to the richer.

This drain on a half nourished system however, leaves them shorn of their sexual power at a comparatively early age.

THE FALLOPIAN TUBES.

As previously stated, the Fallopian Tubes are the connecting passages between the ovaries and the womb. They are usually about three inches, but sometimes they are four or five inches long. At the end next the womb, and for about half their length, they are so minute that a bristle will barely pass through them. Farther out they gradually widen, till near the outer end they are upwards of half an inch in diameter, but getting a little smaller just at the end where they separate into the fringes, or fimbriæ,

before described. These fimbriæ are also called Morsus Diaboti (Latin—Devil's Teeth), from the way they seize the ovary at ovulation. One of these fimbriæ is attached to the outer end of the ovary, the rest are free. The Tubes are covered on the interior surface with Cilia, or hair-like growths, which slant towards the womb, allowing the egg to pass freely from the ovary to the womb, but preventing anything from passing in the other direction. These Cilia are constantly drawing themselves up and then lengthening again, and the walls of the tube contract in successive waves, running from the ovary to the womb-end of the tube, and thus gradually working the egg down from the ovary to the womb. These tubes not only transmit the eggs, but they allow the passage upward of the active animalculæ of the semen, and the passage out and away of the various fluids and other substances which, from sexual excitement or otherwise, are secreted in the ovaries, and which, if they remained, would be very detrimental to the health. A good deal of the various clots, mucuses and fluids which escape from the vagina of even healthy females, are really the product of the ovaries, and it is very necessary that these tubes shall be in a free and healthy condition, so as to allow the free passage of those things, otherwise they remain in the ovaries and set up irritation inflammation and disease, tumors, abscesses, dropsy of the ovaries, and the like.

During a period of sexual excitement, these tubes are stimulated into activity, as well as all the other organs of generation, and, as in all other normal bodily functions, a certain degree of activity promotes their health. For this reason, if they are torpid, or without vigor, the production of sexual feeling is often of great benefit, tending to clear and strengthen them, and thus to prevent disease. At the same time, it is also to be borne in mind, that too much sexual excitement makes the tubes and all the generative organs, at last, weak and nerveless, so that they almost lose their contractile power and capacity for activity, producing the same result—disease and barrenness.

Women of the courtesan class, whose sexual organs are daily, perhaps hourly, excited by intercourse, and in most cases by alcoholic liquors as well, seldom conceive; the proper, natural, regular development and expulsion of the ovum, or egg, being prevented

PLATE III.

SECTIONAL VIEW OF THE WOMB (UTERUS OR MATRIX), NATURAL SIZE.

a, Fundus or Bottom of the Womb, so called because it is farthest from the Vagina, or entrance passage. *b*, *b*, Body of the Womb. *c*, Cervix, or Neck of the Womb. *g*, The Os Uteri, or Mouth of the Womb. The triangular cavity in the Fundus is called the Uterine Cavity, or Hollow of the Womb, that opposite to *c* is the Cervical Cavity. *d*, Is the lining of the Vagina. *e*, *e*, Is the continuous fibrous covering of the Vagina and Womb. *f*, *f*, Represent bristles run through the point where the Fallopian Tubes enter the Womb. During pregnancy the Womb expands from the size here shown to about a foot, or 14 inches in diameter.

by the state of debility which overtakes the Fallopian Tubes and other genital organs.

The tissue of the Tubes is, to a certain extent, erectile, like that of the Clitoris, etc., and the excitement produced by the escape of the egg, with its accompanying blood, from its Graafian Vesicle, causes the tube to become more or less rigid. Some females can feel this erection distinctly, and in some cases, it can even be seen from outside. Sometimes to excite this action by external means is quite sufficient to cure, or prevent, a disease when it is just beginning, the Tubes, thus made active, carrying away the effete matter which had collected in them.

Sterility always results if the Tubes be paralyzed or closed, because the egg cannot then reach the womb. Or, if the tubes be very sluggish, the egg sometimes spoils before reaching the womb, in which case, of course, no pregnancy can take place. This cause of sterility may be removed by stimulating and quickening the action of the Tubes. Barrenness, from closure of the tube, may sometimes be cured by passing a delicate probe through them. This is done by passing a silver tube, of the proper shape, into the womb, until its end reaches the entrance to the Fallopian Tube, then thrusting the probe through it, and on through the Fallopian Tube. If properly and skilfully done this will frequently cure barrenness, arising from closure, when every other means has been tried in vain.

As previously stated, the egg is usually conveyed through the Tube in about two days, reaching the womb about that length of time after the Menstrual Flow ceases, but from sexual excitement, or other causes, its passage may be quickened to one day, or it may be as long as five or six days.

THE WOMB.

The Womb, also called the Uterus or Matrix, is the organ in which the egg is impregnated and developed into the new being. It is essential, for this purpose, to the human female, and to all animals which produce their young alive; but in the Oviparous animals, such as birds, fish, etc., whose eggs are developed outside the body, the womb is less important, and is generally wanting, or less distinct, the egg passing directly from the ovary out of the body, or remaining but a short time in the womb.

The Womb of the human female is situated on a line between

the ovaries, that is to say, midway between the lower edges of the two hip bones. The bladder is immediately in front of it, and the rectum, or large lower bowel, immediately behind it, but each is separated from it at the top by some folds of the intestines. It is connected with the outer opening before described, called the Vulva, by the tube, or passage, called the Vagina. This passage is slightly curved, the hollow of the curve being towards the front, and is about four inches in length on its front side, and about six inches in length on the rear side. It will be described later. It and the womb are enclosed in one membrane, which makes them look, when dissected out, like one organ when looked at externally, but inside they are separate and distinct. The Womb is about two and a half inches in length from top to bottom, as will be seen from Plate III., which represents a lengthwise section of the womb, natural size; it is at the top, about an inch and a half wide from side to side, and about an inch through from front to rear at the middle, its thickest part, while at the lower end it is about three-quarters of an inch in diameter. These are the external measurements, and from them, and from the plate, it will be seen that it is much the shape of a pear, but slightly flattened from front to rear. It is not quite straight, but slightly bent, the hollow side of the bend being towards the backbone. The lower and more slender portion of it, called the Cervix (Latin—Neck), hangs or projects a little way, about a quarter of an inch, down into the Vagina, and the walls of the Vagina are attached to the sides of the womb at that distance up the sides. The womb, of course, is hollow, a slender cavity running its entire length, and having an opening called the Os Uteri (Latin—Mouth of the Womb), into the Vagina. It is through this opening that the semen enters to impregnate the egg, and through it the egg passes away, if not impregnated. This mouth of the womb is a slight cleft from side to side, perhaps a quarter of an inch, or less, in length, and is, in virgins, almost closed, affording but a slender passage for the monthly flow; but in women who have borne children, it is about the size of a common lead pencil. In the virgin it can be felt merely as a slight depression, like a dimple, in the end of the womb; but in one who has borne children, it is large enough to slightly insert the end of the forefinger. The os, or mouth, is a little nearer the rear side than the front. The cavity of the womb has a slight enlargement

just above the narrow mouth, and a greater enlargement at the top, or large end, of the womb. This upper enlargement extends off to two corners at the sides, towards the ovaries, and at these two corners the Fallopian Tubes open into the womb. Externally, the womb is attached to the ovaries, or, rather, they are attached to it by the two ovarian ligaments, or cords. It is held in place in the body by two very strong, round ligaments, called the Round Cords, or Ligaments, of the Womb, and by two others, called the Broad Ligaments. The Round Cords are attached to the two sides of the womb, a little lower than the ovarian ligaments, and at the other ends they are spread out forwards, downwards and sidewise, and attached firmly to the front, or pubic bone. The Broad Ligaments are two broad, sinewy sheets of membranes, which are fastened to the womb, and to the other ligaments at the inner ends, and at the outer ends to the Pelvis, or bony arch, on which the body rests, and they hold the Womb, Ovaries, Fallopian Tubes, and all the internal genital organs in place. Besides these there are smaller ligaments, which connect the Womb with the Bladder, in front, and with the Rectum, or lower bowel, behind. Notwithstanding all these, the womb sometimes fails to stay properly in place. To perform its functions properly, its fastening must necessarily be somewhat elastic, so that it may descend to meet the male organ, and may rise above the pelvic arch, when it enlarges with the growth of the fœtus; sometimes, then, from debility, or disease, these muscles and ligaments become weak and relaxed, and the Vagina, which, when in its normal form and elastic condition, assists in supporting the womb, becomes soft and flaccid, and the womb is allowed to fall away below its proper place. This is called Prolapsus Uteri, or Falling of the Womb. This falling is, in some cases, so bad that the neck of the womb projects from the Vulva, or outer opening of the Vagina, and can be seen externally.

The substance, or walls of the womb, are composed of three coats, the external serous membrane, which separates it from the surrounding tissues, the inner or muscular layer, the muscular fibres of which mostly run round the womb in every direction, and which is very thick and strong, giving it great contracting power. This power continues, or even increases, during pregnancy, notwithstanding the enormous extent to which the womb is stretched

by the growth of the fœtus, or unborn child, and is the chief power which expels the child at birth. In the last stage of pregnancy, the womb ordinarily has expanded from about two inches, its ordinary size, to about a foot in diameter, yet these muscles not only expel the child, but have such elasticity that in a few days after delivery the womb usually returns almost to its normal size. These muscular walls are about a quarter of an inch in average thickness, but a little thicker at the upper or larger part, called the Fundus, or Bottom, and in the middle part, called the Body, than in the lower part, called the Neck. The muscles in the neck of the womb do not become quite so thick again after the first child has been born, as in the virgin. In virgins, also, the womb is straighter and higher up in the body than in those who have borne children, and in the latter the cavity remains somewhat larger also. The inner coating, or layer, is mucous membrane, like that which lines the lips, on which is monthly formed the Decidua, that thin membraneous coating in which the egg is deposited in the womb after each monthly flow, and which monthly comes away with the egg, or with the menstrual discharge.

The Womb is well supplied with Arteries, Veins, and Nerves, as would be expected of an organ which undergoes such rapid and great changes, and plays such an important part in the fact of reproduction. It is, also, highly sensitive, and its condition is sympathetically reflected in the general health of the female probably more than that of any other organ, except, perhaps, the ovaries. The Womb itself, however, is secondary in its essential importance to the ovaries, and where the ovaries are wanting, or undeveloped, the womb will be found merely rudimentary.

The Neck of the Womb is, as well as all the other organs of reproduction, the seat of sexual excitement, in some persons more so, indeed, than even the Clitoris and Nymphæ. The womb, also, like any other organ when excited, becomes congested with blood, and is in a manner erected. This erection tends to open the Os Uteri, or Mouth of the Womb, and to favor the passage of the semen. During this excitement, too, the Womb is, by the alternate contraction and relaxation of the Vagina, drawn up and down with some force and rapidity, and if, at its downward motion, it meets the glans penis of the male, it remains for a moment in pressure of contact, thus permitting the ready passage of the

semen from the penis directly into the womb. The Os Uteri also being somewhat depressed, or cup-shaped, fits the more perfectly the rounded lip of the Meatus, or external opening of the penis, and makes the connection more complete. For this reason, where the orgasm, or highest pitch of sexual excitement in the male and female occurs at the same moment during connection, the probability of conception is much greater than it is otherwise, for then, the semen is thrown directly into the womb, sometimes, indeed, by its force, to the very top of the womb (called the Fundus, or Bottom, by anatomists), next to the Fallopian Tubes, instead of being thrown merely into the Vagina, or passage to the womb, to find its way to the egg within, or to merely pass out and be lost, as may happen.

From the foregoing description, it will be seen that the penis does not, in the human being, at all, or ever, enter the womb, as some have supposed, nor is the semen always thrown into it, and conception has been known to take place when the penis did not even enter the vagina (the hymen being too tough and hard to be broken by it, or the opening too painfully sensitive to bear the entrance of the penis), but the semen was merely, as one may say, thrown in at the door.

In some cases, the Womb is so small and imperfect that the egg is not retained in it, and normal pregnancy in such cases never occurs, though the other organs be perfect. Sometimes, also, the os uteri is so tightly closed that the menstrual flow cannot escape, but is retained in the womb, causing great distress and general ill health, or even positive disease of the womb. I know of a case in which the menses were so retained, the person apparently not menstruating for years, and the os uteri had, a short time before the young woman's marriage, to be opened by the surgeon, letting out a vast accumulation. Of course a great part of the flow had been absorbed, but greatly to the injury of her health. Yet, within a year after marriage, she conceived, and in due course became the mother of an unusually fine healthy child.

The form of the Uterus and Womb varies greatly in different animals; in some, as the cow, pig, horse, whale, etc., it is forked, or divided into two horns, and in them the Fallopian Tubes are very long, and much turned and twisted about. The same forked, or Bifid, condition, is occasionally found in the womb of the human

female. In most carnivorous animals, as the dog, cat, lion, etc., and the Rodentia (Latin—gnawing animals), such as the rat and squirrel, the Womb is very short, and divides into two parts, which connect with very short and straight Fallopian Tubes. Most of these Rodentia have the Womb double, one being connected with each Fallopian Tube, though there is but a single Vagina. In the Marsupials, or Pouched animals, as the kangaroo and oppossum, the Vagina, or passage leading to the womb, is double also, and the Penis of the male is forked, to enter each tube of the Vagina. In these cases, the double Womb is more like simply the enlarged ends of the Fallopian Tubes, extending down to and opening into, the two passages of the double Vagina.

The Womb has been found double in the human female, having two distinct mouths opening into the Vagina, and even the Vagina has been known to be double, having the two complete passages, each opening with its separate Vulva externally, one opening being below, or farther back, than the other. Oftener there is a partition, from front to rear, in the Womb, dividing it into right and left halves. In all these cases, one womb, or one cavity, connects with the one ovary, and the other with the other, so that one side may become pregnant and the other not, at the same time; the latter side may even conceive later, and two infants, of different ages, thus be in the womb at the same time, and their births may occur some months apart. This is called Superfœtation, or conception taking place in a person who is already pregnant by an earlier intercourse.

THE VAGINA.

Leading from the Vulva, or external opening, upward to the Womb, is a passage like a pipe, or tube, about four to six inches in length, called the Vagina (Latin—a sheath, or scabbard). The walls are thick, formed of erectile tissue, like that of a male penis, that is, tissue containing innumerable blood cells, which may be nearly emptied of blood, and then is soft and flabby, or may be engorged with blood when it becomes firm and rigid. This cellular wall of the Vagina is called the Corpus Spongiosum Vaginæ (Latin—spongy body of the Vagina). The diameter, when moderately expanded, may be said to vary from one and a half to two and a half inches, though ordinarily the walls lie against each other in folds. Of course, it may be, and is at childbirth, stretched

to a much greater extent. This tube, or passage, is curved, the hollow part of the curve being towards the front, and fitting and lying against the rounded rear side of the bladder. The round or convex rear side of it is next to the rectum, or large lower bowel. The diameter is slightly less in the middle than at either end. The Vagina is coated, or lined, on the inside with mucous membrane; the walls are not smooth, but in wrinkles or folds, called rugæ, running crosswise and joining a ridge which runs lengthwise. During childbirth, these folds are, of course, all stretched and straightened out, and the Vagina remains always after somewhat enlarged and smoothed out.

During sexual excitement the erectile tissue, or Corpus Spongiosum Vaginæ, of the Walls of the Vagina, becomes erected, or filled with blood, and almost as firm as the male penis. This rigidity serves the purpose, during connection, of keeping the male organ in the centre, and directed exactly to the womb, and it also, by spasmodically contracting its length, draws the womb down to meet the penis, as before described. This erection of the Vagina also makes it compress the male organ, thus increasing the sexual excitement in both. Sometimes, indeed, this rigidity and contraction near the lower end of it, where the cellular tissue is thickest, are so great and forcible, that the penis, or the instrument which may be required in treating the womb, can scarcely pass in. The proper development of the erectile tissue of the Vagina is highly important to the general health of those organs, as when firm and in good condition, it is an important agent in keeping the womb in place, and preventing that bane of women, Prolapsus Uteri, or Falling of the Womb.

The mouth of the Vagina is surrounded by a strong Sphincter, or circular muscle, which, contracting, usually keeps the mouth of the Vagina nearly closed. It also contracts during sexual intercourse, increasing the pressure; indeed, in some persons, particuticularly those whose Clitoris or Nymphæ are peculiarly irritable during sexual excitement, it contracts so strongly as to almost, or quite, prevent the entrance of the male organ, or to cause serious discomfort to both persons after entrance.

Though such extreme and unnatural vigor is undesirable, yet it is highly important that this muscle should be in good condition, as it serves an important purpose in keeping the Vagina, and with

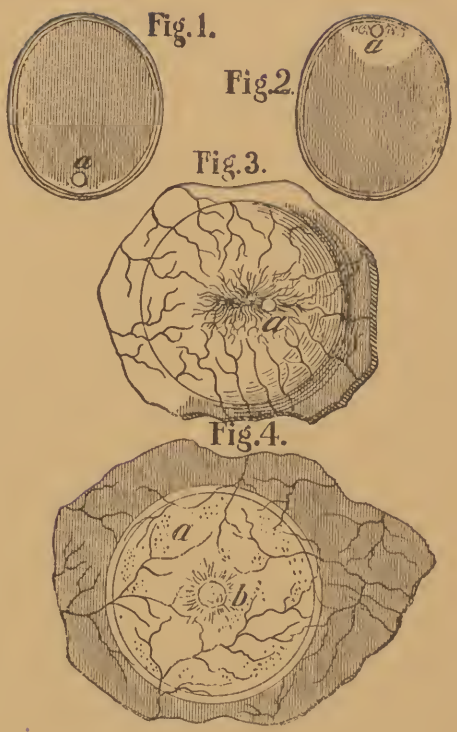
it all the other internal genital organs in proper position. Around the lower part of the Vagina, where the Nymphæ are attached, is a net-work of veins, called the Plexus Retiformii (Latin—Net-like interlacement), which become very much enlarged during excitement, and sometimes, by reason of some obstructions in them, they become permanently swollen with blood, forming varicose veins, and enlargement of the Nymphæ, or inner lips.

Just within the Vulva, or mouth of the Vagina, are situated two little glands, called the Glands of Duverney. These secrete a thickish fluid of a gray color and peculiar odor. The pressure, caused by the circular muscle above mentioned, during connection, and sometimes when connection is not taking place, causes them to discharge this fluid sometimes in considerable quantities, even in some persons amounting to several ounces. It seems to have no other purpose than to lubricate the passage, and prevent friction between the male and female parts during coition. There are, also, other very small glands, or follicles, both in the Vagina and on the inner surface of the large outer lips, which, under similar circumstances, discharge a clear mucous fluid for the same lubricating purpose.

Like the other organs, the Vagina is liable to various imperfections and malformations. Sometimes, either originally or after childbirth, or from debility or disease, it is too large, allowing the womb to fall down into it, even to the extent of protruding from the Vulva externally. Sometimes it is too small to allow the passage of the male organ, or is closed entirely. The closure may be from natural and original malformation, or from inflammation of its lining, causing the sides to grow together. Sometimes it is too short, so much shorter than the penis of the husband, that, unless certain obvious precautions are observed in coition, serious injury may result. Nearly all these defects can be remedied by skilful treatment; but, unless known and removed before marriage, they may cause great distress of mind and unhappiness to the parties, to say nothing of the serious physical injury which may be done.

As stated, in describing the Womb, the Vagina is sometimes, but very rarely, found double in the human female, each passage having a separate, external opening, with separate Sphincter, or circular muscle (called Constrictor Vaginæ) surrounding each.

PLATE IV.



EXPULSION OF THE EGG.

Figure 1. The Egg, *a*, at the bottom of the Graafian Vesicle, which is filled with a transparent fluid. Fig. 2. The Egg, *a*, carried to the top of the Vesicle, now filled with blood. Fig. 3. A portion of the surface of the Ovary, showing the Graafian Vesicle just bursting open and the Egg passing out. (These three figures show the Vesicle magnified about six or eight diameters, and the Egg magnified about ten or fifteen diameters). Fig. 4 shows a portion of the lining membrane of the Graafian Vesicle, with the Egg, *a*, attached. This is magnified, perhaps, one hundred to two hundred and fifty diameters. *b* Is the Germinal Vesicle in the centre of the Egg. The Egg varies in size from about 1-240 to 1-120 of an inch in diameter.

CHAPTER IV.

THE OVUM, OR EGG, OF THE FEMALE, ITS STRUCTURE, AND THE CHANGES WHICH IT UNDERGOES.

THE egg of the human female, is similar in all essential particulars, to that of any other animal. Small as it is, it is composed of two parts, the yellow, or yolk, and the thin layer of albumen, or white, surrounding the yolk. This layer of albumen is, probably, only taken on during its passage through the Fallopian Tube. The Yolk is composed of a rounded mass of minute yellow cells, granules, or grains, called the Vitellus (Latin —the Yolk of an Egg). In the centre of the yolk is a small, round, greenish-colored body, called the Germinal Vesicle. The Germinal Vesicle in the egg of a common hen, called the Cicatricula (Latin—little scar), may be readily seen, as a whitish, opaque spot, on examining the yolk with the naked eye; but in the human egg only with a microscope. The only purpose, so far as known, which this Germinal Vesicle serves, is to break a hole in the egg in escaping, so as to leave an aperture for the entrance of the life principle of the male semen. The various parts of the egg are also separated, held together, etc., by various membranes, as may be seen in the egg of the common hen. This whole egg is so small that it can scarcely be seen with the naked eye, yet it is large enough that the animalcula, or living germ in the male semen, can enter completely within it, as hereafter described, and that it can, and does, develop into a human being, with all his life, parts and complexity. The reason that the bird's egg is, relatively, so very much larger is that, having to develop away from the mother's body, it has to have about it a good deal of nutritive matter to support development, while the human egg, remaining within, continues to derive its nutriment from the mother's body.

The Yellow grains, or cells, of the yolk, are themselves filled with and composed of smaller granules, or cells. So are the granules, or cells, of which the Membranes and Germinal Vesicles are composed. These, again, contain and are composed of still

smaller cells, and so on, as far as the microscope is able to discover to us. Thus it is, also with the other parts of the body, all are composed of cells and of cells within cells, each cell having life and organization of its own, and its own covering, which is also, by the way, composed of similar smaller cells.

The Germinal Vesicle, or cell, is somewhat larger than the other vesicles, grains, or cells, of the Yolk, and is, as stated, itself composed of smaller cells. In the centre these are very much crowded together, forming an opaque spot, called the Germinal Dot.

The Yellow grains, or cells, are the material from which the formation of the new being is begun, the little cells rushing about and grouping themselves together, to form the rudiments of the various organs. The egg is exactly the same in the Virgin as in the Married Woman; the perfect formation of this yellow Vitellus is the last act in the maturing of the egg; and when this is done the egg escapes from its Graafian Vesicle, as before described, and from the Ovary, and passes to the Womb for fertilization.

The Yellow cells of which the Vitellus, or Yolk, is composed, are packed closely together, so as to be squeezed out of round by each other, and even the small spaces so left between them, are filled with smaller cells. In the Yolk of a bird's egg, the larger cells are very much larger than in the human ovum, and can be clearly made out with a moderately good magnifying glass. When the egg is boiled hard and the yolk broken open, its granular structure is clearly visible. If one of the yellow vesicles be punctured or broken slightly, the cells contained in it will run out in a slow, steady stream, their number being such as to occupy as much as ten minutes in all escaping.

As the egg is escaping from the ovary, the various little vesicles, of which the yellow mass is composed, begin to rush about and to arrange themselves in entirely different order, like a squad of soldiers, on expecting a visit from the commander. This is exactly the case. The cells arrange themselves in some likeness to the organs of the new being, and await the coming of the male seminal animalcula. If he comes, as may happen, he at once takes charge of proceedings, those cells group themselves about him, and he, forming the brain and nervous system, is the framework and intelligent director and perpetrator of what would otherwise be a mere temporary arrangement.

For this distinguished visitor an entrance way is made, as follows: During the rush of re-arrangement just mentioned, the Germinal Vesicle mounts to the top of the egg, the containing membrane rends, and the germinal vesicle passes out, leaving a clear passage from the outside to the centre of the egg, and through this opening the seminal animalcula later enters, if impregnation occur, as will be explained later. From what has been said, it will appear that the germinal vesicle, having left the egg on its escape from the ovary, none is found in it after the egg reaches the Fallopian Tube. This fact has led astray some observers who examined only ova taken from the Tubes, or the Womb, and consequently found no Germinal Vesicle.

The progression of the egg forms a series of expulsions, the egg being first expelled from the Graafian Vesicle, then from the Ovary, then the Germinal Vesicle from the egg.

The knowledge of many of these facts was long hidden from physiologists, because the matters observed were so exceedingly minute and delicate, that they could only be seen with the most powerful microscopes, and the most perfect appliances. Yet a knowledge of them is necessary to a proper understanding, even so far as man's knowledge may go, of that most wonderful of God's provisions for the continuance of life, procreation, or the reproduction of the species.

The facts relating to the occasional partial development of the form of a new being in the unimpregnated egg, were given in the description of the nature and functions of the ovaries, in Chapter III.

CHAPTER V.

MENSTRUATION, OR THE MONTHLY FLOW.

PUBERTY.

WHEN a female child is born, and, indeed, long prior to that, her ovaries are filled with thousands of minute cells, or vesicles, called Graafian Vesicles. The number is estimated at about 30,000. These are in a very rudimentary condition. Each little cell contains one egg, and sometimes, but very seldom, two or more. These remain in this rudimentary state, quiet and unnoticed, during childhood. But when the child reaches the age of about fourteen or fifteen years, sometimes earlier, sometimes later, a change begins to take place. Those cells begin to develop and enlarge, the eggs within them also developing. The enlargement continues with great rapidity, till, sometimes, in a few weeks, twenty or thirty of them will be almost as large as small peas, the others being still too small to be visible. This, of course, causes the whole ovaries to increase in size just as rapidly, the change being clearly noticeable, externally, in increased fulness of the groins, where the ovaries are situated. Presently, one of the Graafian Vesicles, or cells, greatly outstrips the others, swelling rapidly, as described in the preceding chapter, until it bursts, allowing the now ripened egg to escape, together with a little blood, with which the cell had been filled and swollen. This blood passes from the ovary into the Fallopian Tube, where, as well as in the womb which it presently reaches, a great excitement and irritation of the parts attend, or precede it, amounting to an inflammation. This inflammation causes blood, and perhaps serum, a watery constituent of the blood, to exude from the interior of the walls of the womb, making a thin reddish fluid, which passes down through the Vagina, or passage, from the womb, getting mixed with the mucous discharge there, and out by the Vulva, or external opening. This is called the Menses, the Menstrual or Monthly Flow, or Courses, or Catamenia (Greek, Katamenios—Monthly), and this period of the girl's life, when her sexual organs are awakening to life, the dawn of womanhood, is called Puberty.

The first flow is usually rather scant, perhaps only a few drops

of red, perhaps more, and lasts one or more days. In some rare cases it thenceforth occurs regularly, but in most cases it is two or three months before the next ovum is ripened, and the next menstruation takes place. After two or three times it should occur regularly at intervals, which vary in different persons, as will hereafter appear, but is pretty constant and regular in the same individual.

The budding woman is perfectly conscious that a change is taking place in her. There is no possibility of ignoring it; body, mind, and soul, unite in calling her attention to the fact that she is becoming a woman. It is common to speak of a girl of sixteen or seventeen as "a mere child"; she may be giddy and frivolous; she may be ignorant and untutored, but she is a woman and she knows it, and happy is it for her if her mother be wise to recognize the fact, and give her necessary information and instruction. During this change in the internal organs, the development noticeable externally is scarcely less remarkable. The expression of the face changes, the eyes, mouth, and every feature telling the awakening of the Woman; the breasts increase and become full and more womanly, and are often the seat of painful, or unusual sensations, the arms and legs round out, the Mons Veneris takes on a thick layer of fatty tissue, and becomes full and prominent, the groin fuller, the Tressoria, or hairy covering, begins to appear on the Mons Veneris and Labia, and a similar hairy growth under the arms. Often all these changes and developments take place in the course of a few weeks, the alteration in her appearance astonishing her parents and friends, as well as herself. She hardly knows herself for the same being. Standing before the glass she looks at her reflection in front, she takes a side view, she looks over her shoulder for a rear view, she regards herself long and earnestly—eyes, face, bust, but especially her eyes—then turns away with a sigh, takes up her long-loved doll, and with a parting hug, and perhaps a tear, puts her away in a drawer. She has consciously bidden adieu to her former self, and has assumed, in her young and ignorant way, the position and responsibilities of womanhood.

The first menstrual discharge occurs at the age, it may be said, of about fourteen or fifteen years, but varies from nine years, or even earlier, to twenty years of age. Out of four hundred and fifty cases observed at the Lying-in Hospital at Manchester, Eng-

land, ten menstruated at eleven years of age, nineteen at twelve, fifty-three at thirteen, eighty-five at fourteen, ninety-seven at fifteen, seventy-six at sixteen, fifty-seven at seventeen, twenty-six at eighteen, twenty-three at nineteen, and four at twenty. Climate appears to have little influence upon the age at which menstruation commences, the sexual precocity of the young females of many hot countries being due to the lax state of morals, and the continued excitement of sexual feeling by what they hear and see, rather than to anything in the climate. In cities, too, menstruation usually occurs earlier than in the country, the cause being the more exciting circumstances of the social life of the city child. Especially is this the case in those places, or amongst those classes where the morals of the young are early corrupted by vile stories, or by seeing demonstrations of sexual excitement in their elders. It is probable, also, that dark-skinned females menstruate earlier than fair skinned ones.

This monthly ripening and expulsion of the egg by the female, and as often as may be its development into the new being, is the great and chief business of her organic system, and to that she devotes more of her nervous and physical strength than to any other process she performs. And if any other function, mental or physical, come into serious competition with that function, physical, and very frequently mental, injury will inevitably result. The sexual functions of the male have very little likeness to this, and exert no such influence on his system, and for this reason he seldom understands and appreciates those of the female at their true importance.

But in the female, from the time of puberty till the turn of life, Nature is devoting her best energies to one purpose, the reproduction of the species. This incessant action of the ovaries, and the sympathy of the surrounding organs, keep the nervous system in a constant state of tension, the woman, during all this period, never knowing a moment of real repose, and this tension it is which makes all her physical functions so liable to derangement, and her mental and moral character at once so sensitive and irritable, and so affectionate and sympathetic, and makes it impossible for her to maintain that evenness of temper and disposition which the other sex find comparatively easy to preserve.

Yet, too frequently, men who have really no excuse for being anything but even tempered themselves, extend very little sym-

pathy toward the woman whose condition is such that she exerts more self-restraint every hour than the average man requires in a life time. Many a woman is subject to "fits of the blues" she calls them, depression of spirits, even amounting to melancholy, alternating with periods of extraordinary gayety, or is seized with sudden impulses and whims, all of which are often attributed by men to mere caprice and fickleness, but which are really but the natural outcome of the nervous tension, caused by the ceaseless consumption of nervous force in her ovaries, etc. Often they are blamed or scolded for supposed contrariness, or perverseness, or they even blame and accuse themselves, and thus their distress is increased; instead of this, every sympathy should be shown them, and full allowance made for the condition of body which produces these states of mind. Sympathy and kindness to a woman under these circumstances, too, will usually, one may say always, exert a most beneficial action on the ovaries, by, to a certain extent, relieving the nervous tension. It is well known that an unhappy frame of mind, grief, fear, anger, depression of spirits, etc., will often so interfere with the action of the stomach as to cause a fit of indigestion, and if long-continued, will produce chronic dyspepsia; and that on the other hand a cheerful, agreeable state of mind during and after meals promotes digestion, while a change of scene, a visit to friends at a distance, or the like, will often cure a case of long-standing dyspepsia, when nothing else can; and dyspeptics very commonly notice that in cheerful, lively company, when out at tea, they eat, enjoy, and digest food which would lie like lead on their stomachs, if taken amid the usual unenlivened surroundings of their own table at home. Now, the ovaries and surrounding sexual organs are immeasurably more susceptible to the nervous influences of pleasant, or unpleasant, experiences, than is the stomach, and it is often seen that females, completely prostrated, and apparently with scarcely enough life in them to breathe, are completely and almost instantaneously restored by a little word of hope or sympathy, or a little kind and pleasing attention from some person from whom it was wished for, but not expected. The little pleasant surprise, reacting through the nerves thus powerfully, is as real a medicine as any drugs, and in very many cases, a much more efficacious one. Every physician finds in his practice many cases which he knows he can never treat successfully, because he cannot remove

the patient from the atmosphere of irritation, and annoyance, and disregard of her feelings, amounting to cruelty, but arising not from any cruel purpose, but from a lamentable ignorance in those about her, including too often an unsympathetic and selfish husband, of the character and necessities of the female composition. Such ignorance respecting the female constitution is, therefore, a serious evil, as by reason of it men frequently act towards their wives and sisters, and even women towards each other, with a greater or less absence of that kindly sympathy and charitable consideration which are so much required.

The ripening and expulsion of the egg is attended by a real inflammation, with increase of temperature, exactly similar to inflammation in any other part; and it is accompanied by a greater or less derangement of the rest of the system, just as occurs in the case of any other inflammation. This inflammation is slight at the beginning of the period succeeding the menstrual flow; but toward the end it gradually increases, until the Ovaries, Fallopian Tubes and Uterus, and in some cases even in the Vagina and Labiæ, become highly congested with blood. When it reaches its height, the congested capillaries, or minute blood-vessels, exude a quantity of blood to relieve the engorgement, just as in the case of inflammation of any other part (a severe cold in the head, for example), and this passes away as the menstrual flow. A knowledge of these facts is highly important, as any medical treatment for either suppressed, excessive or otherwise deranged menstruation, must necessarily be more or less in the nature of quackery, if undertaken in ignorance of them, and may lead to far more evil, and cause more disease, than it will ever cure.

In many cases the first menstrual discharge occurs suddenly and without any previous warning symptoms, though this is by no means usual. For this and other reasons, it is very necessary that young girls should be properly instructed in the matter in good time, otherwise they may, and in many cases are, greatly frightened. In some women this suddenness is notable at every later monthly period, as well as the first.

Generally, however, there are certain clear symptoms by which its approach is readily and certainly known. Some sexual excitement, a sensation of fulness in the head, slight fever, more or less pain in the abdomen, and also in the back each side of the back-

bone, a few inches below the waist. Usually, too, the heart's action is somewhat depressed, causing dark crescents under the eyes, and a general feeling of weariness.

In some cases these symptoms become quite severe, the female complaining that her back feels as if it were "coming apart" there. This last is a very characteristic symptom. Some women suffer intensely at each menstrual period, and are completely prostrated for a day or two, or longer, while, on the other hand, some get on with little or no inconvenience; but few women escape without more or less depression of spirits, nervousness, and irritability. This bodily derangement is what they term being "unwell." In some cities the richer women have a nurse whom they regularly employ during the menstrual period; sometimes the woman has a number of such patients who, menstruating in turn, occupy all her time, and she calls herself a "monthly nurse."

In some cases the monthly discharge begins with quite a gush, but usually the flow is slight during the first twenty-four hours, and pale brownish red in color, but afterwards it becomes more abundant and darker in color, like blood. It gradually goes down to a mere colorless mucus. This, when it continues long, or is too abundant, is evidence of too long continuance of the inflammed condition, a real disease known as Leucorrhœa, or Whites. Its usual duration is about four days, but in some it lasts a week or more, and in others only a day or two, or even only a few hours.

The quantity of fluid discharged averages about six ounces, but varies greatly in different people, some females losing only a very little, while in some it amounts to fully a quart. Both cases are quite consistent with perfect health. Also it is more abundant in hot countries than in cold ones. Many cases are cited by observant physicians to show that excessive outward warmth increases both the quantity and duration of the flow. Thus a lady, who was wont to spend her summers in London and her winters in St. Petersburg, where the houses in winter are kept excessively heated, found that while in St. Petersburg the flow regularly lasted eight days, but in the comparative coolness of a London summer it was confined to four or five days. Dr. ——— also mentions the case of two young women, sisters, who noticed that the excessive flow which, while they lived in the Southern States, was destroying their health, was reduced to a moderate amount and time

while they periodically resided in Philadelphia, and they were at last obliged to remain north.

The color of the discharge also varies a good deal in different persons, in some being a dark reddish brown, and in others nearly or quite colorless. This variation seems to depend chiefly on the greater or less severity of the inflammation which causes it. Where the fluid is colorless the female is apt to suppose that she has not menstruated at all. On the other hand, a red discharge of blood may occur from flooding, the veins being ruptured from mere weakness of their walls, and quite independently of the monthly ovulation. The woman then is liable to suppose that she has menstruated when she has not.

Many peculiar notions were formerly entertained as to the cause and properties of the Menstrual discharge. It was thought that it possessed some poisonous or otherwise injurious qualities, capable of producing a certain venereal disease in the male, if connection were had during the flow; but this belief was without foundation. The peculiar odor probably arises from a certain degree of change, perhaps incipient fermentation which it undergoes, particularly when a little delayed, and it is noticed that the longer it is delayed beyond the usual time for its monthly appearance, the darker it is apt to be, and the more odorous. It was also supposed by some to be in some way caused by the influence of the moon, and that it only took place during full moon; but it is certain that the moon has nothing whatever to do with it, and there are females menstruating at every hour of every day in the year. The usual period, from the beginning of one monthly flow to the beginning of the next, certainly is usually about twenty-eight days, one lunar month, but in very many people the period is not more than two or three weeks, while in others it is five or six weeks, or even more, in all, nevertheless, perfectly healthy, natural and proper. The length of the period is gauged entirely by the frequency of the ripening of the egg. Probably about seventy per cent of females menstruate every four weeks, or thereabouts, twenty-five per cent. say every three weeks, one or two per cent. oftener, and three or four per cent. irregularly.

THE TURN OF LIFE.

Once begun, Menstruation continues periodically, except when interrupted by pregnancy, nursing or disease, until what is

called the Turn, or Change of Life, or Menopause, when all or most of the eggs having been in turn developed or destroyed, Menstruation ceases, and no more eggs are ripened. The age at which Menstruation ceases is usually about forty-five years, but this varies greatly in different persons, some arriving at this point as early as thirty years of age, and others not till fifty, or even later. In one series of observations, it was noted that in seventy-seven women menstruation ceased in one at thirty-five years of age, in four at forty, in one at forty-two, one at forty-three, three at forty-four, four at forty-five, three at forty-seven, ten at forty-eight, seven at forty-nine, twenty-six at fifty, two at fifty-one, seven at fifty-two, two at fifty-three, two at fifty-four, one at fifty-seven, two at sixty, and one at seventy. From these figures, then, it would appear that the average at which these women reached the Change of Life was nearer fifty years than forty-five.

It is not uncommon for menstruation to cease for a time and then begin again perhaps many years after. This would appear to be due to some of the eggs having been in a very much more rudimentary state than the rest, or that their development was for a time arrested, and they ripened afterwards, or from some new impetus being given to the ovaries, just as sometimes one or more apples or cherries on a tree may be found still quite green after the general crop is long ripened and gone. Thus it sometimes happens that women, after having borne a number of children and ceased, have late in life conceived again and borne children in their old age. Cases have been known of old maids marrying and bearing children after reaching sixty years and upwards. Akin to this is the remarkable case of Sarah, wife of Abraham, and ancestress of the Jewish race, who began again to menstruate, and, for the first time, conceived at the age of ninety years, and bore a son Isaac. (See Genesis xvii., 17; xviii., 11; xxi., 2).

Menstruation, of course, never occurs except when an egg is ripened; and as long as there are sound eggs to ripen and pass into the womb, so long may conception occur. Hollick contends Conception never does and never can occur without menstruation. In those cases where a female bore children, apparently having never menstruated, he argues that that menstruation did actually occur, but being colorless, and small in quantity, was not observed as such, as in some constitutions the excitement and inflammation are so slight as to pass quite unnoticed. The appearance of a

red fluid is, therefore, not absolute proof of menstruation, for it may be mere flooding from other causes; nor is the absence of any such red showing conclusive evidence that it has not occurred.

It might be thought that, as a general rule, there being only a given number of rudimentary eggs supplied to the female ovaries at their inception, the earlier the female begins to mature and pass out these eggs, and the more rapidly it is done, the sooner will all be matured and the turn of life be reached; and many physiologists believe this to be the rule. That is to say, the earlier menstruation begins, and the more frequently it occurs, the earlier will it cease. Of course this may be modified by various circumstances; the number of eggs may be unusually great, ovulation may be suspended from time to time by pregnancy or nursing, or the power to mature any more eggs may be early lost by weakness, or disease of the ovaries, and may or may not be restored later.

On the other hand, it will be noticed that, as the number of rudimentary eggs is probably not less than thirty thousand, and, with one matured at each menstrual period, occurring, say, every twenty-eight days for the thirty-five years from fifteen to fifty years of age, only four hundred and fifty-five eggs (about 1-666 of the whole number) would be used up by the Catamenial periods; an early beginning will scarcely hasten the cessation of menstruation by reason of lack of eggs to develop. Indeed, many observers contend that the opposite is more likely to be the case, and that, other things being equal, the female who begins early to menstruate will also cease later. Certainly, though the average age of beginning menstruation may be earlier in hot countries, it does not cease at any earlier age than in temperate climates.

Women in whom the ovaries are wanting, or are undeveloped, never menstruate. This slight exception may be made, that in some cases in which the female has long menstruated, and then the ovaries have been removed by a surgical operation on account of disease in them, a few menstrual periods have been known to occur at first; but this was probably merely from habit, and it has not been reported that such menstruation ever continued. Where the ovaries are absent from childhood, or for any reason remain undeveloped, the girl's whole system either remains in the undeveloped condition of childhood, or develops in a masculine fashion, sometimes a beard sprouting, and the voice becoming harsh and mas-

culine. The same result may follow removal of the ovaries later, or their atrophy (shrinking away) from disease, all the other signs of womanly development also gradually disappearing, even to the hairy covering of the Pubes, or Mons Veneris, and sometimes hair appearing on the face. A similar development of beard is not uncommonly seen on women who have passed the Turn of Life. An analogous result follows the absence, or removal, of the testicles in the male, the person remaining, or becoming, as the case may be, in appearance, voice, and mental character and disposition, distinctively feminine.

Some peculiar notions concerning the Menstrual Discharge have been and, indeed, still are held by various peoples. Among the Israelites, in Bible times, the woman was, during her sickness, as it was called, considered unclean, and the law of Moses so decreed, and forbade sexual intercourse during the period, and for seven days after. And to this day there is no other ceremonial law so vigorously observed amongst the Jews as this, though in some places, as in London, England, the seven days' purification is commonly reduced to three. They reckon five days as the least duration of the period, and even if no discharge be seen after the first day or two, they observe the ceremonial uncleanness for the five days and the seven following, making in all twelve days. If, however, an irregular flow occur between the regular periods, the seven days of purification are reckoned from the cessation of that flow, though it may have continued but a few hours. The Mosaic law on the subject may be found in Leviticus, chapter xv., which also deals with the uncleanness of Spermatorrhœa, or seminal emissions (some say Syphilis or Gonorrhœa) in the male, and in Lev., ch. xx., 18; v. 24 of ch. xv. probably refers to accidental defilement, where the condition of the woman was not known at the time, and v. 18 of ch. xx. to wilful defilement through unbridled lust. The Rabbis have interpreted and amplified the law as above set out. The Menstrual condition is sometimes spoken of in the Bible as "the manner of women," Gen. xviii., 11; and "the custom of women," Gen. xxxi., 35, and appears to have been treated, as the latter passage shows, with great consideration.

During this period of "uncleanness" the women were, of course, prohibited from entering the Tabernacle or the Temple of the Israelites, and in Christian times we find the Council of Nice forbidding a Menstruous woman to enter the Church.

Pliny, the Elder, a Roman naturalist, who perished in the Destruction of Pompeii, A. D. 79, chronicles the belief prevalent in his time, that the Menstrual discharge would even, by its odor, destroy grafts, kill bees, cause madness in dogs, and blight in corn, cause iron to rust, and fruit to fall untimely from the trees, prevent seed from germinating, etc., attributing to it all the petty malignant powers which, in later years, were believed of witchcraft. Somewhat similar notions were said to prevail, until lately, in some parts of England, perhaps even yet. All these notions are, of course, absolutely without foundation.

Marriage should never take place until menstruation has become regularly established. If, however, a woman have reached the age when menstruation usually has begun, and, though the other signs of advancing womanhood are present, no menstrual discharge has been noticed, an examination should be made to ascertain whether an Imperforate Hymen, that is, one in which there is no aperture for the escape of the menses, prevents the discharge, or whether there is any closure of the os uteri, or mouth of the womb. If all things appear normal, careful observation should be made to see whether there is not a discharge of a menstrual character, but so light in color and small in quantity as to be overlooked.

Also, Marriage should not take place until the whole body has been properly developed and grown, especially the Pelvis and Genital Organs. For not only does the probably frequent sexual intercourse of early marriage interfere with the proper growth and development of these organs; but, if pregnancy should occur, the growth of the fœtus takes all the vital energy of the young mother and leaves her stunted or checked in her own growth, and sometimes permanently weakened and injured. Also it frequently happens that when childbirth occurs too young, the parts in the mother are too small to admit a ready delivery of the child, either making it necessary to crush and destroy the infant before it can be got through the bony ring of the pelvis, or lacerating the womb, vagina, and vulva of the mother. For these reasons the Pelvis and other organs should be allowed to attain their full size before marriage.

It is well to have the wedding timed, if possible, to take place about midway between the time when one menstrual period is expected to cease and the time when the next shall commence.

If the marriage takes place either during the period, or so near to it that the excitement attending the event will bring on the flow, as often occurs, the annoyance and distress which may follow are perfectly obvious. Furthermore, just before and after the period, the parts are in a more or less highly excited and irritable condition, and intercourse just then, coupled with the various extraordinary emotions attendant upon the event, is liable to be highly injurious; occurring just before the menses, it has been known to even induce paralysis of some of the parts, with permanent cessation of the menses.

MENSTRUATION DURING PREGNANCY.

As a rule, Menstruation ceases during pregnancy, all the energies of the body being then required for the development of the fœtus. There are some cases in which an apparent menstrual flow occurs once or twice, but in nearly every such case it is mere flooding, bleeding caused by the rupture of a vein, and, if it continue, is likely to cause miscarriage. Therefore, if such a flow appear during pregnancy, the woman should at once lie down on her back, and no time should be lost in summoning a physician.

Sometimes, however, true menstruation occurs. For some time after conception there is vacant space in the womb, below and at the sides of the spot where the embryo is attached, leaving a free passage from the Fallopian Tube on one or both sides to the mouth of the womb. If then, as sometimes happens, the ovaries, or either of them, should go on maturing eggs, menstruation may be set up. Many cases have been known in which not only menstruation, but a second conception, has taken place some months after the first. In such cases the second infant may be born either prematurely along with the first, or may remain in the womb after the earlier one has been born in due time, and, a second labor coming on when the second has reached full term, it is expelled in due course. This second conception is called superfœtation, and will be treated of later.

MENSTRUATION DURING NURSING.

For a similar reason to that mentioned in the case of Pregnancy, Menstruation is usually suspended during nursing, the mother's strength being so fully occupied in producing the milk for her child's sustenance and continued development, that none

can be spared for ripening the ova, and menstruation. The purpose of menstruation and egg ripening is conception, and careful Nature usually sees to it that both a born and unborn infant are not drawing upon the mother for their sustenance and growth at the same time. Even the action of the ovaries and menstruation are themselves a severe tax on a woman's vitality, and if this drain be superadded, as it sometimes is, to that of an infant at the breast, it nearly always exhausts the strength and injures the health. Happily this state of things seldom occurs except in women of superabundant vitality, who can stand the drain, but, where menstruation and ovulation go on during nursing, as they sometimes do, in a woman of less vigor, it is very liable to overtax her strength to such an extent as to shorten her life. Also, if the mother become thus weakened, the milk is likely to be weak and watery, and to afford insufficient nourishment to the infant. In such cases, if menstruation persists, it is prudent, for the sake of both mother and child, to discontinue nursing, and bring the infant up on the bottle.

The fact that nursing usually prevents menstruation, ovulation and liability to conception, is well known to most married women, and those who wish to postpone, or avoid entirely any future conception, not uncommonly continue to nurse their babe long after the time when, both for her own sake and the infant's, it should be weaned.

This necessity, under which a woman is often placed, of choosing between the drain of too long nursing, and too frequent child-bearing, either of which may permanently undermine her health, would be obviated if husbands, in such cases, would exercise a little more continence, and restrain their self-indulgence.

CONNECTION DURING MENSTRUATION.

The question is often asked of the physician, "Is sexual intercourse during menstruation improper?" No unvarying rule can be given on this point. In most cases it is, for obvious reasons, likely to be disagreeable to both husband and wife, in some cases even painful to the latter. Some rare cases are met with in which the discharge is of an acrid character, and produces irritation of the external female genitals, and is liable to have a similar effect upon the organ of the male. Also, especially after suppression of the menses beyond the usual time, the discharge is found to be

more or less fetid in character, and, if there were any abrasions of the skin, it might even cause blood poisoning. The old notion, however, that connection during the Menstrual Flow causes gonorrhœa, or any such disease, is without foundation. It has also been supposed by some that if conception occur by intercourse during menstruation, the infant will be diseased, or insane; also that the purple and other patches on the skin, which some have from their birth, indicate that the person was conceived during this Catamenial period. There is, however, no ground for these suppositions.

Usually, considerations of delicacy are alone sufficient, without other reasons, to induce most people to abstain at such a time. There may, however, in some cases, be reasons amply justifying such intercourse. Some females never experience any sexual desire at any other time, and it occasionally happens that one who will conceive at no other time, may become pregnant by intercourse during that, her only time of venereal excitement. Speaking in general terms, then, it may be said that there is usually no scientific objection to intercourse during menstruation. Indeed, some have thought that, as the lower animals desire connection only during the Heat, or Rut, corresponding to the menstrual period in the human female, that is the natural and proper time for sexual intercourse in human beings. But, as many other considerations, besides mere animal passion, enter into the association of the sexes in man, and as, in most cases, conception occurs at least as readily at some other times, the conduct of the beasts in this matter need not be considered as necessarily a pattern for man. Even in beasts, it is often noticed that in the earlier days of the heat, when the flow from the parts is greatest, the female refuses the male, probably, of course, from lack of desire at that stage.

Many conjectures have been offered as to the purpose of the menstrual flow. One is, that it is intended by Nature as a means of periodical purification, by thus working off matters which would be hurtful if retained. This supposition would seem to be discounted by the fact that young children and men, who would seem to need purification as badly, are at least as healthy without any such function. Others think that the womb is periodically congested with blood, in readiness to receive an impregnated ovum, and to afford it nutriment, but when no conception occurs in the

expected or contained egg, the congestion is otherwise relieved by rupture of the capillary blood-vessels, and the pouring out of the superfluous blood. Others, again, suppose that in the womb the ends of many capillaries stand against the innermost lining membrane of that organ, and that in menstruation these burst out, pushing off that membrane, to be carried away as minute patches of epithelial scales, and leaving the open ends of the capillaries to furnish a ready attaching and feeding place to the impregnated egg on its arrival. There is probably some truth in these last two theories.

Some have thought that Menstruation is peculiar to the human female, but careful observation makes it clear that there is something analogus to it in the lower animals. Whether in those which have their Rut, or Heat, several times a year, or in those which have it only once in one, two, or three years, there is seen at such times in all animals a discharge from the genital organs of the same nature as that observed in the human female. Usually, however, it is nearly colorless, though in some varieties of Monkeys it is tinged with blood.

PLATE V.

Standing with reluctant feet
Where the Brook and River meet,
Womanhood and Childhood fleet.

Gazing with a timid glance,
On the Brooklet's swift advance,
On the River's broad expanse.

. . . . . .

Like the swell of some sweet tune,
Morning rises into Noon,
May glides onward into June.

—*Longfellow.*

CHAPTER VI.

HYGIENE OF PUBERTY.

THOUGH this is not a medical work, yet the importance of a right knowledge of the needs of a young girl at this critical period of her existence is so great, that I deem it not unwise to devote a few pages to the Hygiene of Puberty, how the young girl may best retain her health, and attain a proper development, making the best of her capabilities for womanhood, during these years of change.

Though the remarkable changes referred to at the beginning of this chapter, sometimes occur within a few weeks, yet they are usually much slower, occupying sometimes a couple of years, or more, from the beginning of the development of the eggs from their rudimentary condition, to the regular establishment of full womanly condition. During the period of two years, more or less, this transition stage—the birth of the woman—endures, during which the infant woman demands not less careful, devoted and patient supervision than the infant child; for during this period she is peculiarly liable to diseases of the flesh and perversions of the mind. She must be protected, not only from the ailments which surely arise from any neglect to recognize the importance of the change at hand, but also diseases which affect other parts of the body with especial frequency during this period. For it is a fact that, just as the infant is liable to disorders from causes which do not affect grown people, so the girl, during the infancy of her womanhood, is likewise peculiarly susceptible to influences which do not affect her younger or older sisters. These ills are mental and moral, as well as physical.

INHERITED TENDENCIES.

Constitutional tendencies and inherited taints and weaknesses, which have lain dormant since her birth, are now very apt to begin to show themselves. Only too often the child of consumptive parents, though she may have enjoyed fair health up to this time, gives way when the increased demand of sexual development is made upon her, and begins to manifest the first clear symptoms of her parents' fatal malady. So, too, insanity, epilepsy, or falling fits, hereditary syphilis, and many other affections, the tendency

to which was imparted with her parents' blood, or acquired through ignorance, attack the girl at this her critical period, and either bear her down at once or obtain a foothold, from which they can never be dislodged.

CHLOROSIS.

Again, there are certain ailments which seem to affect the children of robust and delicate parents alike. Such is the disease popularly known as the Green Sickness, because of the greenish tinge sometimes exhibited by the otherwise pale countenance, and called by the physicians, Chlorosis. In this disease the blood is impoverished, whence the extreme pallor; yet the root of the evil is not in the blood, but in the nervous system. It is not much noticed or thought of in its beginning; the girl begins to be unusually weak and easily fatigued; is averse to exertion and avoids society; has a fickle appetite. These symptoms often exist for some time without other symptoms, quite puzzling the parents, and even the physician. Then occur impairment of the digestion, constipation, palpitation of the heart, extreme paleness, irregularity, or even suppression of the menstrual flow. Sometimes she develops strange and absurd tastes, such as for nibbling slate pencils, eating chalk, devouring large quantities of pickles, drinking vinegar, etc. Mental perversities no less remarkable may be exhibited, the rosy, healthy child of a few months before becoming an irritable and irritating invalid, peevish, fretful and unreasonable. Her friends become alarmed, thinking of consumption, heart disease, etc. She is pale, so they dose her with iron tonics, thinking that always the thing for pale people. It should be realized, however, that the matter is too serious to trust to home remedies, and a competent physician should be consulted at once. The disease is one, however, which could have been easily avoided; it is caused by lack of air, sunshine, exercise and amusement; by anxiety, fear, or other disagreeable emotions; by physical or mental overwork. In its earlier stages it can almost always be cut short by change of scene, of occupation, and of company.

FOOD.

The care demanded by the girl relates directly, of course, to her bodily functions, but just as certainly to her mental state.

Certain rules should be observed throughout the entire period of puberty, and certain additional precautions are necessary during

the menstrual flow. It may seem unnecessary to remark that the first requisite is food; yet it is, nevertheless, true that unusual attention should be paid to both the quantity and quality of food during this period of development; for the girl's appetite is often very capricious. She is sometimes, though rarely, inclined to eat too much. Oftener and worse, she is either positively disinclined for nourishing food, or rejects all but some particular sorts, and these often of the least valuable and wholesome kinds, as cakes pastry and sweetmeats. It is needless to prescribe any particular course of diet, but simply to say that the girl should have an abundance of nourishing food at regular hours. On the other hand, she should, and probably will, show a marked increase of appetite, and so far from being teased for this, she should be encouraged, for during these years the rapid development of her system demands an unusually great supply of nourishment for its proper carrying out.

Meat, especially fat meat, the usual garden vegetables, fruits, and especially milk, may constitute the bulk of her diet. Wines and alcoholic drinks of every sort, injurious enough at all times, should be strictly avoided during this period. Tea and coffee, too, which at no time are particularly advantageous as regular diet, may at this time be positively injurious. The same may be said of all highly seasoned food.

SLEEP.

The next most important factor in the building of both body and brain is sleep. Early to bed and late to rise would be a wise adaptation of the old saw to this period of life. The hours which the girl may apparently lose by lying late in bed will be redeemed a hundred fold in her more mature and valuable years. Insist that she go to bed early, permit her to sleep as long as she pleases. Do not fear that she will contract an idle habit, any more than a sick person does by lying in bed all day. When the period of her development is over, she will not only be as ready to rise early and work late, if necessary, but far readier, and infinitely better fit to do so than if she were, during this period, required to keep the hours which are only fit for maturer years.

EXERCISE.

Exercise, too, is indispensable to proper development. Fixed rules for so many hours of this or that sort of exercise, cannot

be laid down; but this one rule is invariable, namely, that that only can be considered exercise which gives the girl pleasure. She may be quite able, if she like it, to skate, or toboggan, or row lightly, or play lawn tennis, or ride on horseback, by the hour (though those should not be carried to excess), and really perfectly unable, if she don't like it, to wash, or scrub, or spin, or do many other jobs of housekeeping, to say nothing of the hard and constant labor in shops and factories, to which so many immature girls are sent. To give benefit, exercise must give pleasure; then it reddens the cheeks, lightens the step and the heart, and sends the blood bounding through every artery, carrying life and health to every part, and especially to those parts which are now so rapidly developing.

OUTDOORS.

It is important, too, that exercise should, as far as possible, be taken in the open air, where the lungs can be filled with that free and good gift of heaven, and the whole body can absorb health and vitality from the life-giving rays of the sun. Animals, as well as plants, and not least the human animal, attain their best development in the sun. Do not worry about her complexion. She has no need of a complexion yet, and if she get sunshine enough to make her as brown as an Indian, she will be the better, and have all the better, clearer, and rosier complexion when she is a few years, or even a few months, older. Physical exercise is important also for this—that it directs her attention from herself, and prevents her from brooding over the strange sensations and mysterious changes which are going on within her, and of which she has as yet no definite comprehension; keeps her a child until childhood's day is really past, and gives her the powers and graces of womanhood by the time she begins to realize the possession of its desires and responsibilities. Exercise is, also, one of the best safeguards against the vicious habits to which girls, as well as boys, sometimes become addicted during these years of life. It is commonly observed that these habits are much commoner and much stronger in those young persons who have not had the advantages of out-door exercises, which the youth of both sexes so naturally crave.

CLOTHING.

Clothing is, also, a matter of great importance. Happily, amongst the best people, a sensible habit of dressing their children

is becoming more and more common ; but there are still those who dress their child with regard, much less to the child's comfort and health, than to their own vanity. Why a child's clothing should be bunched around her waist and body, leaving her arms, neck and legs bare, or but thinly covered, is a puzzle surely to all who stop to think about it.

Yet we will not stop to remonstrate upon this common mode of dressing children before puberty, since the ill effects, the imperfect protection against the weather, are readily apparent, and the child suffers only the immediate and direct effects. With the commencement of puberty, the style is changed to the extent of somewhat lengthening the skirt, but sufficient care is seldom taken that the entire body and limbs should be evenly and warmly clad, especially during the menstrual week. Thick shoes and warm thick woolen stockings may not be so dainty and pretty as the thin stuff in which too many foolish mothers delight to dress their budding daughters, but they are absolutely necessary and, even from the standpoint of beauty, they are far more profitable in the long run. The young woman's neck, shoulders, and the figure generally, will be far more attractive a few years later, when she will value them, if carefully, completely, and warmly clothed now.

Then there is the corset, the inevitable corset. Inevitable did I say, no, for the reign of the corset is happily almost ended. The number of women is large, and increasing more and more rapidly, who eschew the corset with all its works. See you the women on the streets—this with round pinched-in waist, and with body moving stiffly along, as if carved in wood and moved by some wobbling machinery underneath, corseted ; this with lithe body, tapering in flowing curves to the flexible oval waist, walking with graceful, swaying motion, she is emancipated from the prison of steel and goes with the grace and beauty of a free woman. Moreover, the uncorseted woman not only looks better, and is more admired by the men (and that is a consideration with every rightly constituted woman), but she is better. If Nature placed a certain amount of material just within her waist line, that waist line cannot be pinched in without crowding that material to where it does not belong, and it, in turn, crowds something else out of place. Now, the intestines, which are squeezed out from the waist, go partly upward, crowding the liver and

stomach against the diaphragm, interfering with the proper action of the lungs and heart; and they go partly downward, squeezing the womb, ovaries, bladder, kidneys, etc., down and out of position. If a woman, who has reached mature years insists on doing this, I suppose she will do it; but as she values her own and her daughter's health and comfort, let her neither cause nor allow that daughter to wear corsets during that critical period when she is developing her new womanhood. It is all very well to say, "Oh, I don't wear my corsets tight" Certainly you don't. It is always the other woman who wears her corsets tight; but somehow or other your daughter gets the idea, whether from you or from someone else, that the corsets must give her "shape." And she will wear them tight enough to do so, and shape she gets, but it is not the shape her Creator, who loves her best, intended she should have. Yet I should despair of having this advice at all accepted, though all medical men agree in it, were it not that some wise women have led the way, and it is now rapidly becoming fashionable to dispense with the corset; and we may hope before long to see it considered in the same light as the little foot bandage of the Chinese female child, or the forehead compress of the Flat-head Indian.

REGULARITY.

Another important consideration in the care of the girl during puberty is the prompt and regular evacuation of the bowels and bladder. If either the rectum or the bladder be habitually distended, there is apt to occur a change either in the shape or position of the womb, for, as pointed out in Chapter II., the womb lies between and adjacent to these, so that if they are full they press upon it, crowding it while growing, and causing it to grow out of place, or out of shape. It frequently happens in schools, particularly in the country, that there is not sufficient attention paid to the privacy and comfort of the privy closet convenience and the young girl, rather than go to it, neglects the calls of Nature, and sets up a habit of constipation. Indeed, even at her home it often happens that this very necessary convenience is so built and situated that in winter the wind whistles up through it, and the result is that she, in the first place, stays away from it as long as she can, and, in the second place, those then unusually sensitive parts are chilled; and, particularly if it be during the

menstrual flow, serious consequences may ensue. It is, therefore, very important that proper provision should be made for attending to the calls of Nature in comfort, and that it should be strongly impressed upon the young girl's mind that she must, on no account, omit to visit the privy closet at least once a day, and that the bladder should be promptly emptied as soon and as often as the physical inclination rises.

SCHOOL.

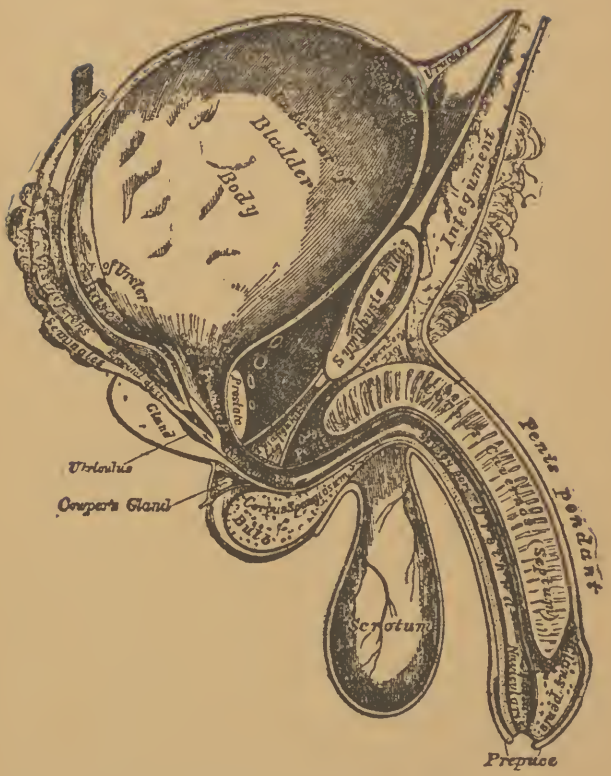
Just one other point I must touch upon, the mental activities of the girl during puberty. At this period the energies are directed most strongly to the development of the sexual organs, and to the general changes which accompany it. These necessities make a great demand upon the blood supply and the general vital force of the girl, and they cannot allow anything else to usurp their first place. Their great rival in our system on the American continent is the School. Now, there is not enough blood in the body to keep all parts full at once, so Nature sends her reinforcement, in the shape of increased blood supply, to that part in which it is most in demand, the part where the most work is going on. The blood is the tissue builder. Work is a tissue destroyer. Moderate work or exercise breaks down the old tissue, and the blood as fast or faster rebuilds it with new material, and benefit results. Immoderate work or exercise, whether of brain or muscle, breaks down the tissue faster than the blood can rebuild it, and exhaustion follows. A good blood supply to any part, short of congestion, produces growth; a poor blood supply results in non-development, shrinkage, atrophy, according to degree. If the brain be engaged in deep and long-continued labor, the chief blood supply is there, and the chief expenditure of nervous force is made there. During vigorous exercise the blood bestows most attention upon the muscles; during digestion, upon the stomach. If we exercise our muscles, or engage in study immediately after eating, the chief blood supply goes to the muscles or the brain, and leaves the stomach insufficiently supplied with blood, and digestion is impeded. In the same way, if long hours be devoted to severe mental labor, as is often the case in our schools, and with school work done at home, the chief blood supply during all that time goes to the brain, and the development of the sexual organs, where, during puberty, much blood is required, is retarded. I would not

suggest that school work should be entirely dropped during these years, but I would insist that the unnatural stimulus of competitive examinations, the desire of teachers to make a good showing, with a view to fame and increase of salary, or even with a praiseworthy desire to see the child's education progress rapidly, or the vanity of parents who wish to see their child's cleverness proudly demonstrated, or even the girl's own ambition to keep even with the rest, should not be allowed to distract her vital energies at this period from the fundamental necessity of the time, the development of her womanhood. If the girl can be allowed to go to school and "take it easy," well and good; and even then she should be kept out of school for a few days during each menstrual period; but if she cannot go to school without entering into the keen competition of modern school life, and endeavoring to demonstrate that she is at least the intellectual equal of her brothers and the other boys, then she had better be out of school entirely for two or three years. And it will be found time well spent, which she spends in developing and perfecting her physical system, and she, with her better health and sound constitution, will not only be a brighter, happier, and better young woman for it, but better able to pursue her studies and to more than make up, in a few years, the time which some would think lost.

LIGHT READING AND COMPANIONSHIP.

It is important, also, at this time especially, to look carefully after the girl's lighter reading and companionship. Good novels are beneficial, instructive, elevating. Mere silly love tales and impossible romances improperly excite the imagination and fill her with false and often injurious views of life. The company of pure, bright young people, of both sexes, is beneficial, that of the vicious, or depraved, is utterly damnable. Parents should not merely scold when their daughter's companionships are not to their taste. She must have company; her age and nature demand it. Do not think that a little trouble to provide her with suitable young companionships is labor thrown away. It is well spent, and will be amply rewarded by the present and future gratitude of a happy girl, and by the consciousness that you have saved your daughter from many a snare which bad or indifferent company lays for such as she.

PLATE VI.



SECTIONAL VIEW OF THE MALE ORGANS OF GENERATION.

The terms used will be found sufficiently explained in Chapter VII.

CHAPTER VII.

THE GENITAL ORGANS OF THE HUMAN MALE.

THE Male organs of Generation, like the female, are some of them external, some internal.

The external organs are: The Testes, or Testicles; the Epididymis (Greek, epi—upon, Didymos, the twin, or double); the Scrotum, or Bag, which contains the testicles; the lower part of Vas Deferens (Latin—the carrying-off tube), and the Penis.

The Internal Organs are: The upper part of the Vas Deferens, the Seminal Vesicles, the Prostrate Gland, and the Ejaculatory Canal, or Duct.

THE TESTES.

The testes, or testicles, are two small glandular organs which secrete the semen. They are situated in the scrotum, or bag, just beneath the front part of the abdomen, one on each side of and a little below the root of the Penis. They are not held up by the bag, but by two ligaments, one for each, called the Spermatic Cords, which run from the back part of the testicle to the bony ring of the pelvis.

During fœtal life, they are contained in the cavity of the abdomen, the spermatic cords extending upwards and outwards to where the respective testicles lie, in front and a little below the kidney, but from the fifth month to the end of the eighth they gradually descend into the scrotum. In their descent through the internal abdominal ring, they press down and carry through with them a fold of the numerous muscular, fibrous and other linings of the abdomen, which thus form a sort of sac, or pouch, in which they rest, hanging by the spermatic cords and tissues. Just before birth the upper part of this pouch usually becomes closed up, separating them from the abdominal cavity.

Each testicle is in the form of an oval, slightly flattened at the two sides, and about straight at the back. They lie in a slanting position, the lower ends being a little closer together than the upper, and farther back. The front, sides and ends are rounded, and free and smooth, and covered by a thin serous membrane called the Tunica Vaginalis (Latin—enveloping coat). Next

inside that is the Tunica Albuginea (Latin—white coat), a strong thick membrane, of a bluish white color, composed of bundles of white fibres, which interlace in every direction. Inside this again is a layer which contains the larger blood vessels of the testicle, and within is the substance or body of the testicle itself. This consists of about three hundred minute tubes, each about sixteen feet in length and 1-200 of an inch in diameter. These are called the Tubuli Seminifera (Latin—minute semen-producing tubes), and in them the semen is originated. They are rolled and twisted up, sometimes two or three together, into little rolls, or lobules. These lobules each occupy one of the little intervals into which the testicle is divided by fibrous partitions, as shown in the Plate. These tubes are straight as they approach the back part of the testicle, and there they pass upwards and backwards, interlacing, running into each other, and separating again till they reach the upper end of the back of the testicle. There they run into fewer and larger straight tubes, called the Vasa Effereutia (Latin—carrying-out tubes), which carry the semen out of the testicle. Just outside the testicle these begin to run in a twisted or convoluted form, like one-half of a spiral bed spring, making a cone-shaped lobule, and these lobules together form a compact mass, called the Globus Major (Latin—larger globe) of the Epididymis, as shown in the Plate. At the bases of the cones, formed by these tubes, they all empty into one larger tube, which continues in a similar twisted or convoluted form, downwards along the back of the testicle, forming the body, and lower, the small globe of the Epididymis. From this point it is straighter, and is called the Vas Deferens (Latin—carrying-off tube).

THE VAS DEFERENS.

The Vas Deferens is the duct which carries off the semen from the testicle into the body, preparatory to its being cast out through the penis. This duct passes up along the back of the testicle beside the Epididymis to the Spermatic Cord, which holds up the testicle, thence up the back part of that cord into the abdomen. There it passes in a curve up around the side of the round of the bladder near the top, and down and towards the middle line of the bladder at the back, where the two, one having come from each testicle, come near together at the back of the neck of the bladder, as shown in Plate.

PLATE VII.

Fig. 1.

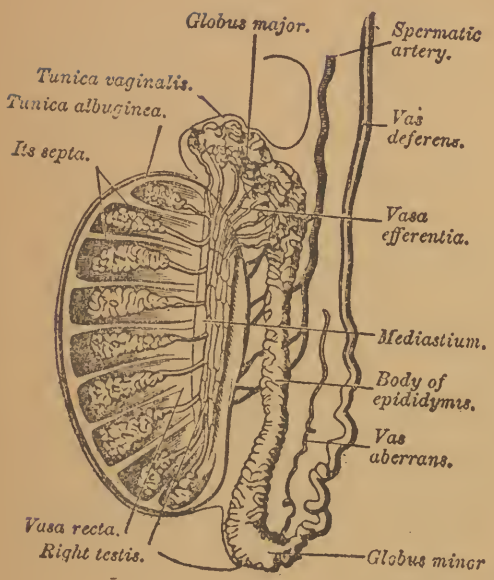
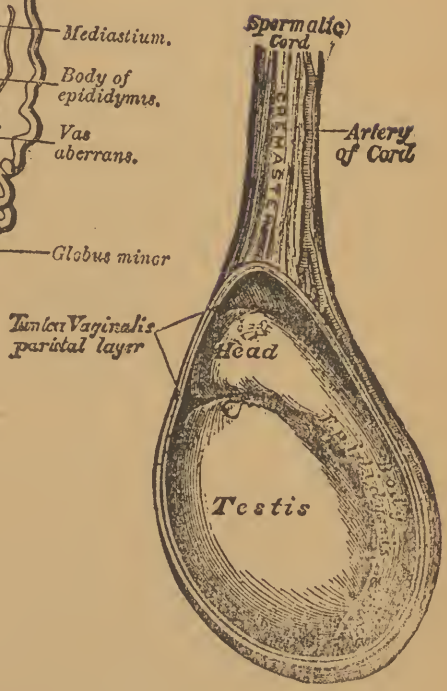


Fig. 2.



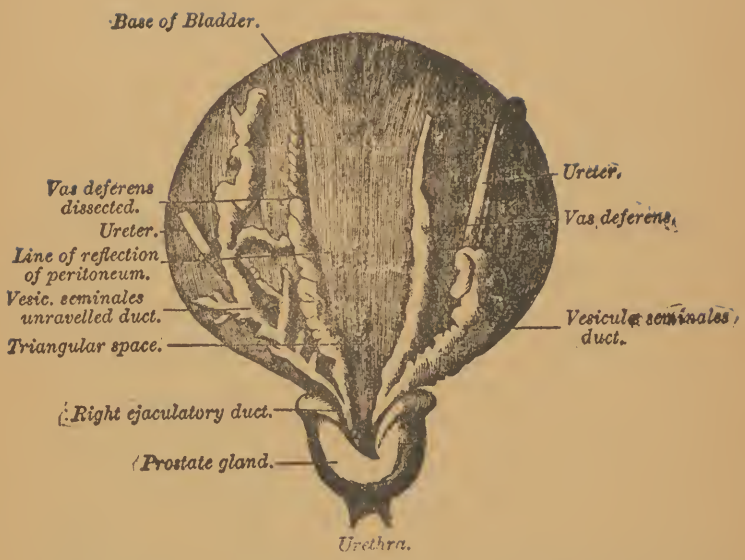
THE TESTICLE.

Fig. 1. A section of the Right Testicle from front to rear, showing the partitions in it, with the seminal tubules, etc. The right-hand side in the Plate is the rear side of the testicle.

Fig. 2. The Testicle exposed, with its Epididymis, supporting Spermatic Cord, etc.

The terms used in this Plate will be found sufficiently explained in this Chapter

PLATE VIII.



The Base and Neck of the Bladder, showing the Prostate Gland surrounding Neck, the Ejaculatory Ducts within the Gland, and the Vasa Deferentia and Seminal Vesicles lying against the base or back, lower side of the bladder. The left Seminal Vesicle (Vesicula Seminalis) is shown unravelled and straightened out, the right, as it lies in Nature. The two Vasa Deferentia are shown cut off. In Nature they extend from the Testicles up over the front of the bladder, and down where the part appears in this Plate. The Prostate Gland appears as cut open to show the Ejaculatory Ducts.

The terms used will be found sufficiently explained in Chapter VII.

THE SEMINAL VESICLES.

Lying also against the back of the bladder, and farther to each side than the two Vasa Deferentia, are the two Seminal Vesicles. These are two tubes (each having some branches) closed at the upper or outer end, and opening into the Vasa Deferentia at the neck of the bladder. Each is from four to six inches in length when straightened out, and about as large as a quill, but it lies folded up together into a long mass about two and a half inches long, half an inch wide, and a quarter of an inch thick. These serve as reservoirs, or storage places, for the semen, and they secrete also a fluid which mixes with it, and, Fowler says, enlivens and feeds the spermatozoa, or animalculæ, of the semen.

EJACULATORY DUCTS.

The right and left Seminal Vesicles, joining the Vasa Deferentia, as shown on this Plate, form the Right and Left Ejaculatory Ducts, which extend downwards and forwards through the Prostrate Gland, and open, by little slits, into the Urethra, the tube used in common for the expulsion of the Semen and of the Urine.

In this Urethra, just behind these openings from the Ejaculatory Ducts, is a little cross ridge of muscular and erectile tissue, called the Verumontanum (Latin—true mountain), which becomes large and firm during sexual excitement of the parts, preventing the semen from passing upwards into the bladder, and the urine from coming down and mixing with the semen.

PROSTRATE GLAND.

Surrounding the Ejaculatory Ducts and the Urethra, next the neck of the bladder, is the Prostrate Gland. This is about the size and shape of a horse chestnut. It secretes a slightly acid, milky fluid, which passes by numerous little ducts into the urethra on each side of the Verumontanum, and gives its milky color to the semen, and sometimes to the urine. The Prostrate Gland is of a very firm and heavy, but easily crumbled, substance. It is divided into three parts or lobes, one behind against the rectum or lower bowel, and the other two in front. In some persons the rear lobe is absent, and in some, particularly in old men, it becomes swollen, hard and painful. This gland may be felt with the finger through the wall of the rectum. The use of its milky secretion is unknown.

THE SCROTUM.

As stated above, the testicles hang in a bag or pouch of loose skin, called the Scrotum. This is covered thinly with coarse, crisp hairs. Down its middle, from front to rear, extending backward to the Anus, and forward down the under side of the Penis to its end, is a distinct ridge in the skin, called the Raphe. Corresponding with this ridge, and on the inside of the Scrotum, is a partition extending from front to rear of the entire pouch, and dividing it into two compartments, in each of which hangs one of the testicles. The left spermatic cord being a little, perhaps half an inch, longer than the right, the left testicle hangs lower than the right. This allows one to move past the other when they are squeezed together, as by crossing the legs, and prevents injury. The testicles are extremely sensitive, and an unnatural pressure on them causes excruciating pain.

Within the skin of the Scrotum is a strong, thick, elastic layer of fibrous and muscular tissue, called the Dartos. Cold or sexual excitement causes this to contract, pressing firmly against the testicles, and leaving the skin of the Scrotum, which is everywhere attached to it, to go into numerous wrinkles or folds. Indeed, in health and vigor, this Dartos is usually pretty well so contracted, but in old age or weakness it generally becomes lax, and lets the scrotum hang down long and loose. This fact was well known to the ancients, and in their sculptures old men and weaklings were usually represented with the scrotum pendant as we have just described it, and as it appears in the plate at the beginning of this Chapter.

Next within the Dartos, and coming next to the Tunica Vaginalis, or outer covering of the testicle itself, is the Cremaster Muscle. This is one of those tissues which were brought down by the testicles in their descent from the abdomen before birth. It consists of a sheet of muscular tissue, and its use is to draw the testicles upward against the abdomen; this occurs during copulation, and adds greatly to the pressure on the testes, and assists in driving the semen forward.

THE PENIS.

Immediately in front of the scrotum is the Penis. This is the Male organ of copulation. It is attached to the body at the bottom of the abdomen, below the pubic bone, and hangs in a curved form forward and downward when at rest, but forward

PLATE IX.

Fig. 1.

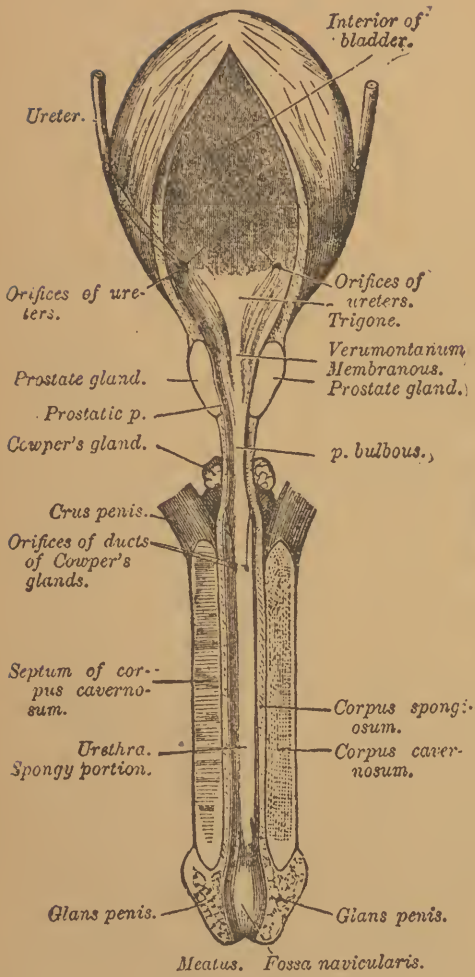


Fig. 2.

SECTIONS OF THE PENIS, SHOWING INTERNAL STRUCTURE.

Fig. 1. Longitudinal section of the Penis.

Fig. 2. Transverse section of the Penis. *a*, *a*, Right and Left Corpora Cavernosa ; *b*, Corpus Spongiosum ; *c*, the Urethra.

The terms used are sufficiently explained in Chapter VII.

and upward at an angle of about twenty or thirty degrees to the horizontal when erected. When quiet, it is about three or four inches in length, but is often drawn up shorter by cold, pain, etc., and about an inch in diameter. During erection it is about six inches in length, and perhaps one and a quarter to one and a half inches in diameter. All these dimensions, of course, vary greatly in different persons.

The Urethra, the tube down which the urine escapes from the bladder, passes down through the penis. The Penis, like the Prostrate Gland, consists of three lobes, one in the rear or under part, and two side by side, forming the upper part. The two upper lobes practically form one division, called the Corpus Cavernosum (Latin—hollow body), but some physiologists, on account of the septum or partition between the right and left parts, use the plural number, and speak of them as the Corpora Cavernosa. Where these two parts join, on the under side, the edges are rounded, forming a groove, and in this groove the urethra lies. The rear, or under part, is called the Corpus Spongiosum (Latin—spongy body).

It surrounds the Urethra, or urinary canal, and fills in below the Corpora Cavernosa, making the whole organ, when not erected, quite round. At the rear end it is much larger and thicker, forming what is called the Bulb of the Urethra. These Corpora form the body of the penis, extending from the Pubic bone, to which it is firmly attached by what is called the Root of the Penis, or Crura Penis, to the head, or Glans Penis, which terminates it at the outer end. The skin of the abdomen, or rather of the Pubes, all around the root of the Penis is covered, after puberty, with hair, as is the female pubes. Where the sexual development is imperfect, this hairy covering is generally absent, and removal of the testicles by surgical operation, accident, or destroying disease, often causes it to fall out, and the parts to become bare, as in childhood. During erection the three lobes are easily noticed, and the organ is then slightly triangular.

The whole penis is surrounded by a very fine thin skin, usually of a darker color than the skin of the body, and so elastic, and connected with the layers beneath it so loosely, that even when the organ is erected it slides easily several inches in any direction. This skin covers only the body of the organ, and is firmly fastened round the neck, or place where the Corpora join the head or Glans

Penis. It is, however, considerably longer than the body of the organ, and falls in a loose fold down a greater or less distance over the Glans Penis all around. This fold is called the Prepuce, or Foreskin, and is the part which is cut off in the rite of circumcision. On the under side of the glans the attachment of the Prepuce extends nearly to the end, this bit of lengthwise attachment being by means of a cord or ligament, called the Frænum. In some cases this ligament is too short, so that during erection, and especially during coition, it is pulled so tightly as to cause great annoyance bending the glans down, or even sometimes being torn asunder by the violence of the erection.

The Glans Penis is an enlargement of the Corpus Spongiosum of the body of the Penis, but extends also across the end of the Corpus Cavernosum. It is in the form of a section of a cone, rounded however, at the end, and slightly flattened at the top and bottom. It extends farther back at the top than at the bottom, the Corpus Spongiosum at the bottom extending forward to a point where the Frænum, or Preputian Ligament is attached. Around the rear end or rim of the Glans is a slight ridge, called the Corona, or Crown of the Glans, and immediately behind this is a depression, called the Cervix, or Neck. In this depression the Foreskin is attached, and just in front of the attachment are a number of cells, which produce a whitish, cheesy secretion of a peculiar odor. Unless attention is paid to cleanliness of this part this substance accumulates in considerable quantities and becomes hardened, causing irritation and even sores.

Though the two parts of the Penis, the Corpus Spongiosum and the Corpus Cavernosum, differ a good deal in their structure, they are alike in this, that they are composed largely of erectile tissue. Erectile tissue, as before described, is full of blood vessels and cells, opening into each other, and capable of being greatly swollen with blood. These connect with the main branches of an artery. In the ordinary state these blood vessels and cells are nearly, or quite, empty, but when excited the blood from the artery is driven into them, filling them tightly, and causing the organ to enlarge and become firm and rigid. This is called Erection, and such tissue is called Erectile Tissue. It is not only the main component of the Male Penis, but enters largely into the structure of many of the female sexual organs, as the clitoris, nymphæ, vagina, etc., and even of the nipples of the breasts. When the sexual excite-

ment subsides the blood flows out by the veins, and the erection goes down. It sometimes occurs, however, that there is some obstruction to the outflow of the blood, and then, to the person's great annoyance, the erection remains, though the excitement and desire are gone.

In some cases the rush of blood into the cells of the erectile tissue has been so violent as to rupture them, totally destroying the power of erection. The quickness of erection varies in different persons, in some the tissue filling in a very short time, in others more slowly, and the same variation is noticed in the quickness with which it subsides. This variation seems to depend largely on the nervous vigor of the parts, the old finding erection slower and its subsidence much quicker than the young. The Muscle, called the Erector Penis, assists in lifting it to the position it occupies during erection.

As stated before, the semen is thrown by the Ejaculatory Ducts into the Urethra, about three-quarters of an inch from the bladder. From this point the Urethra serves a double purpose—first, to carry off the urine from the body, second to carry the semen into the vagina of the female. It is for this second use that it possesses the power of erection, the rigidity being necessary to the proper performance of this natural function. Also the urethra is much lessened in size during erection by the pressure upon it of the congested blood vessels, and this enables the impulse given to the semen by the contraction at the rear part of the urethra to eject it forcibly from the *meatus*, or opening at the end of the Glans Penis. The Urethra is a tube about a sixteenth of an inch in diameter on the average, but is a little larger near the base of the penis, and again near the neck; it extends from the bladder to the extremity of the Glans Penis, where it opens by a slit-like opening about a quarter of an inch in length, extending in a direction which would be called up and down when the penis is horizontal. This orifice is furnished with little labia, or lips, and is called the Meatus Urinarius.

As will be noticed from the description above given, the form of the organ of copulation of the Human male, the Penis, corresponds exactly to that of the female, the Vagina. And in the various lower animals the form varies for a similar purpose of adaptation. That of the cat, and of some others, is covered with spines, giving the female great pain during connection, the precise

fitness of which, however, it is hard to see. In some the structure is such that the sexual act is performed in a moment, as in the bull and horse, while in others it is very slow, as in the dog and pig. In birds the male organ is very short, a mere spot or button-like prominence, which does not enter the female organ at all, but merely presses against it and throws the semen within. In some animals, as the raccoon, a part of the Corpus Cavernosum is ossified, or turned into bone, the small bone thus formed running perhaps one-half the length of the organ. This is also sometimes found in white men, and often in Negroes. In some animals, such as the kangaroo, oppossum, etc., the penis is double, to fit the double vagina of the female. This form has been found in men, but is, of course, a monstrosity, as is a double Vagina in woman. In this case it is really merely a single penis, divided into two parts, usually one only having the urethra, and capable of discharging either urine or semen.

ABSENCE, DEFECTIVE DEVELOPMENT, AND MALFORMATION OF THE PENIS.

In some persons the penis has been lost, destroyed by accident, or removed by surgical operation, and in some it is absent from birth. Sometimes it is no more than a quarter of an inch in length, or even only a slight swelling, like that of a male bird. In such cases copulation, in the ordinary sense, can, of course, never take place, yet, if the other sexual organs are all right and produce perfect semen, such men may become fathers. For even if the male organ cannot be introduced within the female, yet if the semen be only shed within the external lips, some of the seminal animalculæ may find their way through the vagina and womb, and reach and impregnate the egg of the female. Many cases have been known in which conception was induced by artificially injecting the semen into the vagina with a syringe, or even catching it in a spoon and placing it within. Of course some females will not conceive without some degree of sexual excitement, and in them such artificial means would probably not bring about conception. For other reasons, than this uncertainty of producing children, men so incapable of copulation should not marry, when the result must be to disappoint the woman of that commerce to which a wife is, by Nature and by law, entitled. A person of either sex who unwittingly marries one who is for any reason in-

capable of sexual intercourse, is entitled by the law of almost every nation to have the marriage declared null and void from the beginning. Cases have been known in which conception followed the use of an artificial penis, an instrument made to fit upon the stump of the amputated organ, and resembling in shape and size the part which was lost.

Sometimes from birth the skin of the Penis is grown fast to that of the Scrotum, tying it down, or to that of the abdomen, tying it flat against the body, or it may be attached to either leg. Such cases can be cured by a slight surgical operation at any age, as it is only the skin which is attached. Any such malposition should be promptly remedied in infancy, as it causes great trouble in urinating, and, of course, would effectually prevent copulation when the boy grows up. In some cases a contraction of the skin, or of the muscles on one side or the other, draws the organ to that side and makes connection impossible. In such the skin or muscle must be divided by the surgeon, and this may be easily and safely done. If, however, it results from a tumor growing on one side or the other, that must be removed before any improvement can take place. More difficult to deal with are those cases in which the deviation is caused by an Aneurism (swelling in an artery), or swelling in a vein, or by the rupture of the blood cells on one side from too violent erection, allowing the blood to accumulate on that side. Dr. Hollick mentions the case of such an arterial blood tumor: "Every time erection occurred a large tumor was formed on the left side, full of blood, which turned the organ to the right side, and thus prevented connection. This accident had been caused by numerous forcible and long-continued erections in one night during intoxication. The tumor was as large as an egg, and when full could be distinctly felt to pulsate (showing its connection with artery). It was also very painful, and appeared ready to burst. The remedies proposed were cold astringent lotions, and wearing a thin plate of smooth horn over the part, bound on so firmly as to prevent any swelling from accumulation of blood. This plan succeeded very well in giving relief, though it is probable there will always be more or less tendency to a recurrence of the trouble."

Sometimes the Frænum, or ligament, which connects the foreskin with the under side of the Glans Penis, is so short that it causes the penis, during erection, to bend down, so as to either

prevent penetration entirely, or to prevent the semen from escaping, or cause it to be thrown against the wall of the vagina, instead of forward into the womb. The simple remedy for this is to cut the cord with a sharp pair of scissors, or a lancet or razor, taking care to cut no further than just to sever the cord. Bathing the part in hot water before the operation, or in cold water after it, will stop the blood, and any man can do it easily and safely for himself. Besides the inconveniencies above mentioned, the cord may be torn asunder during coition, or by a violent erection, causing great pain and perhaps loss of blood, and it is, therefore, best to remove the trouble as directed.

WANT OF DEVELOPMENT IN THE PENIS.

As the size of the Penis varies greatly in different people, there is no exact standard, and it is difficult to say whether a penis is too short and small or not. In some persons, while the other organs may attain the usual development, the penis remains of the same size as in childhood, while in others the development is only partial. Hollick mentions a man whose penis was only about two inches long and as thick as the little finger (about the normal size for a child of five or six years), but in whom the testicles were of average development, and the sexual feelings and flow of semen full and strong. And plenty of men, whose organ of copulation is much below the usual size, nevertheless, become the fathers of families. Usually, however, an undeveloped penis is accompanied by more or less deficiency in the more essential testicles.

Non-development of the penis may arise from a general inactivity of the Genital Organs, especially of the testes, and in such cases the remedy must be directed to stimulate and arouse them, in the manner hereinafter to be pointed out.

But where the deficient development affects the Penis only, the treatment must be directed to it in particular. In some such case the imperfection seems to consist in its smallness only, the power of erection being perfectly present, and the individual can accomplish both connection and impregnation, and the reason for effecting an improvement are, therefore, not so urgent, though there may still be very good reasons.

Usually, however, in these cases of imperfect development, the erectile power is quite absent, or is so slight that intercourse

cannot be had. Under these circumstances, of course, an increase in size and power is highly important, both for the pleasure of the persons concerned and for the purposes of procreation. And in describing the means to be taken to produce such improvement, I cannot do better than to quote the words of the same eminent authority, to whose work I have before referred, Dr. Frederick Hollick: "It is proper to remark, however, that the cases now referred to are those in which the small size is congenital, that is, existing from birth, and not those in which the organ has decreased, from disease or excess, after having been of average development, though in many of such cases, when the constitutional stamina is not too much impaired, the same means will restore what has been temporarily lost."

The causes that prevent the proper development of this organ, as well as of others, are of course unknown in those cases that are congenital, because they operate before the birth; but in those that become arrested during childhood, or youth, we generally trace it to early masturbation, blows on the Testicles and other accidents, or to some severe disease, which has impaired the vital energy very much. Some diseases are particularly apt to affect young persons in this way, as the Mumps, for instance, which often make the Testes swell.

Scarlet Fever and Measles, when severe, I have known to seriously injure the virile power, but not so frequently as Rickets and Scrofula. A similar deficiency is sometimes found in females, in some the uterus or ovaries being very small, though the vagina may be large enough to allow of coition, while in others these organs will be of usual size, but the vagina will be too small, so that Marriage is not allowable.

To affect an enlargement of the Penis, in addition to every means proper to improve the general health and impart stamina, there are certain mechanical and manual applications, the effects of which, under right direction, are often of the most unexpected and pleasing character. To understand the nature of these and their mode of action, it is necessary to bear in mind the anatomical structure of the organ, and the requisites for erection. That phenomenon, it will be recollected from our previous description, depends essentially upon the filling up of the vessels and cells of the Spongy and Cavernous Bodies with blood; and, of course, if there be any fault in their make or mode of connection, or if the

blood does not flow into them, erection cannot take place. Now this is precisely the fault that is found to exist in most of the cases of non-development above referred to, and is what requires to be corrected. On dissecting such cases after death, we find that the cells and minute vessels have never been congested or filled with blood, and consequently the organ has never been able to grow, or become erected. In the same way, after long-continued excess, or debilitating disease, the artery seems to lose its power of transmitting the blood with sufficient vigor, and the cells, from want of being filled, decrease in size, and evidently grow up more or less, causing the organ to shrink. This is the reason, also, why absolute suppression of sexual excitement, if continued too long, will make the organ waste away, instead of increasing its power, as many uninformed people suppose.

The object to be accomplished, it will be seen, is to open these cells and cause the blood to flow into them, so as gradually to increase their size, and dispose them to fill spontaneously, from natural excitement.

In some persons, who have shunned all thoughts of sexual matters, from a notion that they are improper, it is sufficient merely to encourage such thoughts to a proper extent, and the excitement this gives rise to in the parts will act favorably on their growth. In others the daily employment of a warm local bath, with brisk rubbing and the use of a stimulating ointment, which I shall hereafter describe, will be found still more efficacious; and if this treatment be regularly persisted in, under judicious direction, combined with proper internal remedies, it will succeed in a large number of the cases ordinarily met with. It is requisite, however, that the external and internal stimulants be exactly apportioned to the wants and capabilities of the individual's system, and that a strict watch should be kept upon the action and effects of each, so as to know when to increase or decrease their power, and when to suspend their action altogether. Until over forty years of age, if the form of the organ be perfect, and its development not too small, a considerable change may be effected in this way, though the younger the patient is, the more readily the parts are acted upon.

I once had a patient call upon me from Cuba, the son of a rich planter, who was troubled with this imperfection, and who was intensely desirous that it might be remedied, so as to allow of

marriage. He was about twenty-three years of age, and of a strong, robust habit of body, with excellent health. On examination the penis was found about *two inches and a half* in length, and about as thick as the forefinger, projecting forward, but with little more sensibility than any other part of the body. The Testicles were fully developed, and the sexual feeling was quite strong. There had been frequent emissions of semen under strong excitement, but no erection, and consequently no connection could take place. Upon inquiry, I found that he had been brought up to a very rigid code of morals, and had imbibed certain notions about the necessity of not indulging sexual desires, if the mind was wished to become powerful; as he was very ambitious of distinction, he made a perfect anchorite of himself. The bodily effect of such a course has been seen—its effect on the mind was to make him wayward, irritable, and unhappy. A short time before he came to see me, he met with a young lady with whom he fell violently in love, and immediately the desire for marriage arose, but with it came the fear that he was totally incapacitated. The new desire, so strongly awakened, together with the fears he felt, operated so intensely upon him that he became almost violently insane. On assuring him, however, that there was a reasonable prospect of his attaining a more perfect state, he became calmer, and patiently submitted himself to the prescribed treatment.

The first object was to induce as much heat as possible in the organ, so as to promote the flow of blood to it. This was accomplished by the use of a hot stimulating lotion, two or three times a day, followed by brisk rubbing with flannel and soft brushes. In three weeks the effect of this treatment became obvious—erections occurred, partial at first, but ultimately quite forcible, and the organ began evidently to increase permanently in size. In addition to this he was directed to use some stimulant drops, and to live generously, to impart as much vigor as possible to the Generative organs.

The flow of semen soon became much larger than before under this treatment, and the procreative instinct more powerful. There was still one fault, however, and that was a want of power in the *muscles* that assist in erection and coition, more especially in the Erector Penis muscle. This was remedied by frequent *shampooing* and pressing of their fibres till they acquired volume and firmness, the same as any other muscle would do under similar treatment.

This system was rigidly pursued for six months under my own inspection, at the end of which time the Penis was four inches long when erect, and quite firm, so that coition was possible. At this period he was desirous to return home, and as he was evidently determined to pursue the same treatment himself, I consented to his doing so, though I would have preferred for him to have stayed still longer. I heard from him eleven months after his departure, and he then informed me that the improvement had still continued till he no longer thought it necessary to proceed. He was then intending to marry in about three months.

In some cases which fail to yield to the treatment outlined above, an instrument is used, called a Congester. This consists of a glass tube of a size and shape proper for the purpose, open at one end, to receive the Penis, and provided with rubber to fit tightly against the body, and at the other end filled with a small exhausting air pump. The penis is introduced into this tube and the air partially exhausted, with the result that the blood immediately flows into the penis and fills up the blood cells, producing an erection. This exhaustion of the air from the tube has to be done slowly, and with the greatest care, guarding against rarifying the air too much, or the in-rush of blood may be so great as to rupture the blood vessels and cells, forever destroying all possibility of erection. With care, the part in a little while, as the air pump is slowly operated, begins to swell and look red, and a more or less perfect erection occurs. Unless the organ is practically dead, or the structure of the tissues completely broken up, this cannot fail to produce erection. Care must be taken not to carry the process too far at once, but to be content with slight results from each operation. And the full supply of blood thus given to the shrunken or insensitive cells and blood vessels soon causes them to grow and develop in a surprising manner. And these results have often been obtained, not only when the organ was long enough but too small and quite incapable of erection, but also in cases where it was not more than half an inch long, and quite unable to erect itself, or even where it was a mere slight swelling just above the level of the skin of the body. It cannot be expected that in all such cases, especially if the person be no longer young, the organ will be developed to anything like average natural size, but in nearly every case, where it is not absolutely without vitality and the organization is normal, it will become large enough at least to

serve the purpose of copulation, and in very many cases it becomes as perfect as if it had properly developed from childhood in the usual way.

The Congester does not, however, act upon the Erector Penis, and other muscles of erection, and if these do not perform their part of lifting the organ to its proper position, it will, notwithstanding it may become large, full and firm, hang down. These muscles are nearly always deficient when the Penis is imperfect, and must be strengthened and developed by shampooing in the manner described above.

Shampooing these muscles is a practice in vogue in Oriental countries from ancient times, the luxurious and lascivious Turks and other polygamists giving much more attention to their generative organs than do the colder blooded Western peoples. Also their practice of polygamy and the maintenance of harems invites to an excess of venereal indulgence little known with us. In their cities there are men whose regular profession is that of Shampooer of the Genitals. The good results of shampooing these muscles have, however, been known in Europe for many years, and the practice is becoming more and more common. But the work has not yet become so usual here as to call into existence a professional class, and every man who requires it must do it for himself, or hire an untrained assistant; and in either such case the operation should be under some medical direction.

Development of these muscles by this means is, of course, slow and not altogether painless, but the results are often excellent.

To perform this operation conveniently, the hairy covering of the pubes (around the root of the penis) should be shaved off, and the parts lubricated with a smooth oil or ointment. The forefinger is then pressed firmly into the muscle to be remedied, and rubbed briskly backwards and forwards with the fibres of the muscle. This is continued till the muscle becomes hot and slightly swollen, when the operation ceases for that time. The operation should be repeated every day, and with every muscle requiring improvement, until the desired result is obtained. After a few times the pain and soreness, which the process first causes, pass away, and the muscle becomes firm and elastic to the touch, and is noticed to become daily stronger.

All these means of improvement require a considerable length of time to obtain the best results, and the patient must be prepared

to exercise great diligence and perseverance, but in the end he will be, in almost every case, delighted with the improvement, and will esteem the cost as nothing, compared with the wonderful results obtained. There is no other physical defect, the consciousness of which is so likely to prey upon the mind, as sexual incapacity, particularly when the organs are sufficiently well developed to cause sexual desire, and the defective condition of the penis makes the consummation of marriage impossible. Under such circumstances there are few men but will take infinite pains to perfect their physical manhood, especially if they have made choice of the individual with whom marriage is desired. To such we may say that the cases are few, indeed, in which patience and perseverance will not be rewarded with a fair degree of success, and it is not going too far to say that many a case of insanity, and many a suicide's grave, might have been and may be avoided by a careful and intelligent application of the knowledge above given. Hollick declares that he has treated patients of all ages, from mere youths to as old as fifty-two years, and most of them with very gratifying success.

A resort to drugs and patent medicines, we have to say, in spite of the extraordinary testimonials which some of the latter advertise, and in spite of the popular notions regarding some of the former, seldom does any good whatever, and they often are highly injurious, not to say dangerous, in the hands of any but a skilful and conscientious physician. The cases in which they apparently did some good were unquestionably cases in which no actual corporal incapacity existed, but the patient was timid, and his mind had been so worked on by some of the pamphlets and advertisements which he had read, that the result was produced which he feared. The taking of a highly recommended medicine gave him confidence, and his bodily capacity, which was all the while quite perfect, asserted itself.

A remarkable case, treated by Hollick, was that of a young man about nineteen years of age, the son of a physician. In this person there was no sign of a penis, except a small swelling of not more than a quarter of an inch, in the middle of which the urethra opened. Yet the testicles were of ordinary size, and apparently perfect in their structure, secreting semen in fair quantities, and the little protuberance which represented the penis was

quite sensitive, but never erected. Another physician to whom he was shown had, though unaccountably, pronounced him a hermaphrodite. Of course copulation, in the ordinary sense of the term, was out of the question. A Congester of a special form was made to suit the case, and the treatment was given daily. The first exhaustion of air caused the penis to protrude into the Glass Congester fully two inches and caused great pain, and the organ remained very sore for some days. But the patient was much gratified to notice a certain internal sensation which he had never before experienced, the sensation of erection, and the blood cells and vessels were filled with blood. Hot stimulating lotions were applied, and the muscles were diligently shampooed every day, and after the first soreness had subsided the Congester was applied daily, followed by shampooing. He also took a daily warm bath, with brisk after-rubbing of the whole body, followed by horseback exercise. This treatment was continued for ten weeks, by which time the penis, in its ordinary state, was full two inches in length, and when in the Congester three inches. Partial erections began to occur also during sleep. For three months, then, the use of the Congester was omitted, the young man continuing the general treatment—shampooing, bath, horseback exercise, etc.—at his home, and the improvement continued, though slowly. Then the use of the Congester was resumed, and with the result that in two months more the penis measured three inches in length in its ordinary state, and when in the Congester four inches. Ordinary erections also occurred, with a full emission of semen, and the patient was discharged cured, to the great delight of himself and his father, and the astonishment of the physician who had pronounced him a hermaphrodite. Another case is mentioned of a married man thirty-two years of age, in whom, though the other organs were perfect, the penis was of natural ordinary size, and the desire of copulation strong, yet it had never erected itself. The Congester was used with considerable caution, and the third application produced a powerful erection. Owing to imperfect action in the veins which return the blood from the congested cells, the erection did not subside for some time, but this passed away, and the use of the Congester continued daily for two weeks. At the end of this time the defect was cured; natural erections occurred from the ordinary causes, the patient's bodily capacity was as perfect as any man's, and he became the father of children.

The Congester, with the appropriate general treatment, is so wonderful in its power that not only those whose powers are latent, but those in whom they have been destroyed, or weakened by sexual excesses, self-abuse, mental anxiety, or debilitating disease, may look forward to receiving a radical cure, or, at least, great improvement, unless the cellular structure of the organ is practically destroyed.

Galvanism is sometimes used, with good results, where the trouble is chiefly from weakness of the nerve supply. This should be used with great caution, and only under the direction of a competent physician, as too great a shock may cause paralysis of the nerves intended to be benefited.

Flagellation and *Firing* are two other practices sometimes resorted to with success.

In Flagellation an instrument is used like a little whip, or cat o' nine tails, composed of six or eight small thongs, of very flexible twisted leather, or catgut, about as thick as a violin string. With this the external genital organs, having first been shorn bare and smooth, are flagellated, or beaten, applying it so on the penis down its entire length, and on the Pubes round the Root of the Penis, on the Perineum, or part between the scrotum and anus, and on the inside of the thighs, for say about a quarter of an hour, till the flesh grows red and hot and smarts a little, but not enough to produce any soreness. After the flagellation the patient should bathe the parts well in hot (not warm) water, and lie down for awhile. This remedy is practiced to a considerable extent among the French, and is frequently quite effectual in producing erection, and a general beneficial stimulation of the parts. Even the first treatment in this way will sometimes produce a full strong erection. Of course the patient must be prepared to expect that it will, during the process, naturally enough be somewhat unpleasant.

Firing consists in the application of a hot iron button to the parts. A smooth iron button is made hot by immersing it in boiling water, and the parts to be benefited having first been made bare and smooth, the button is taken out of the hot water and applied to the part which is deficient in growth or energy, allowing it to remain on only an instant, then re-dipping and re-applying it till the whole part requiring it has received an application. No part should be touched twice, nor should the button be applied too

near the testicles, lest it should produce inflammation in them. The operation does not blister, and produces but very slight pain, the spot to which the button is applied first merely turning white, then red. After the effects of the first application have gone off, which will be in about three or four days, the process should be repeated, and so on till the desired improvement is effected.

This process is particularly useful in cases in which it is desired to apply treatment to a particular spot, or side of the organ, as where one side does not fill in erection so well as the other, causing a curve towards the less developed side. The treatment is sometimes very efficacious, a single treatment often being quite sufficient.

ABNORMAL TESTICLES.

Though the testicles are usually about the size of a small bantam's egg, or large pigeon's egg, and weighing about one ounce, they may vary a good deal from this and still be perfectly healthy and capable. They are sometimes even as small as marbles and sometimes as large as a good sized hen's egg, but in both cases perfectly good. Where the other organs had developed in the usual way, but the testicles remained small, it is generally found that, though small, they, nevertheless, are able to perform their function properly, and men in whom this is the case need not hesitate to marry on account of the smallness of these organs. For the testicles appear to be the governing force, and unless they develop properly, at least in structure and capability, the penis will remain dormant and undeveloped. If, however, the testes, after having attained the usual size, atrophy and shrink away, as they do sometimes from injury, by disease, or by destruction of the powers through excess or self-abuse, the person is probably incapable of procreation, and proper means should be taken to restore them to normal size and vigor before he should think of marrying. The use of certain drugs, particularly Iodine, is very apt to cause the testicles to decrease in size, and to injure, or even destroy, the power of begetting children.

The habitual use, even in small quantities, of those poisons which tend to kill the animalculæ in the semen, such as strychnine, arsenic, opium, etc., also is liable to destroy to a greater or less extent the virile power.

Sometimes an injury of some sort will cause one, or both, of the testes to waste away, or one may be even destroyed or re-

moved entirely, and yet the person remain perfectly capable, the testicles seeming to act quite independently of each other.

If the testes be unusually large, one may fairly suspect some disease, such as Hydrocele, or Hernia, and the most careful examination and inquiry should be made by a *competent* physician. I say competent, because it is undoubtedly true that, even amongst physicians, the most lamentable ignorance exists as to almost everything pertaining to the organs of Generation, and unless your physician shall have made a special study of this branch of his profession, it often would be found wise to ask him to refer you to some trustworthy specialist who has. However, if the testes have been of large size from the time of puberty, and especially if they both and the penis are alike large, they may, nevertheless, be perfectly healthy.

In some cases there is a general want of development of the testes and penis, owing to delayed puberty, the young man retaining the hairless condition of face and pubes, the treble voice and the general appearance of the child, instead of attaining the appearance and condition of manhood. In such a case a diligent course of general treatment, such as was outlined in case of undeveloped penis, is appropriate, such as stimulating washes, friction and "shampooing," stimulating diet, warm bathing, followed by rubbing and out-door exercise, etc., and if persevered in, will usually produce more or less full, though late, development. Of course the younger (after fourteen or fifteen years of age) that the remedial measures are adopted, the better and the greater the probability of success, but even up to the age of thirty, great improvement has been known to be effected; and even at a greater age it would be wise to try.

Cases are said to have been known in which *three* perfect testicles have been found in one person; but in nearly every case in which there appear to be three testicles, it is found that one of them is merely the Epididymis somewhat enlarged, or it is a small fibroid, or other tumor.

In some cases there is but one testicle, the other being entirely absent from some cause operating at the time of conception, or having been, from some cause, in a merely rudimentary condition at the time of birth, it was afterwards absorbed by the surrounding tissues and disappeared.

In most cases, however, in which there appears but one testi-

cle, or none at all, the testicle has, for some perhaps undiscoverable reason, merely failed to descend into the scrotum before birth (as is usual about the end of the eighth month of pregnancy), and has remained in the abdomen.

If this be the cause of the apparent absence of these organs, no concern need be felt, for the fact of non-descent does not in the least hinder their development, nor lessen the person's procreative power. All those cases in which persons supposed to be without testicles have, nevertheless, begotten children, are merely cases in which the testicles have failed to descend into the scrotum, but have attained the usual development and functional capacity in the abdomen. In some cases the testicles have begun their descent from their first fœtal position below and a little in front of the kidneys, but their course downwards has been arrested in the lower part of the abdomen. This is worse than if they had retained their original position, for they are liable to be so pressed upon by the surrounding organs and tissues as to cause them to waste away and fail to develop at puberty. Even after development a long-continued pressure on the testicles will cause them to atrophy (or shrink and waste away) and become powerless. This was well known to ancient heathen priests, many of whom, to preserve their chastity and to effectually remove their supposedly sinful desire for sexual intercourse, in effect castrated themselves by applying a long course of constant pressure to the testicles.

In some rare cases the testicles, having been retained in the abdomen, descend late in life, and, sticking in the internal abdominal ring through which they should pass into the scrotum, become inflamed, causing great pain, and even danger. In such cases they are sometimes mistaken for ruptures, and, being treated accordingly, waste away with the pressure and become powerless. Where they have so descended properly into the scrotum, uninformed persons have imagined that they had suddenly grown, perhaps, from rudimentary specks to normal size.

In some cases where there was supposed to be only one testicle there are really two, but the usual septum, or fibrous partition in the scrotum, which separates them, is absent, and the two are grown together.

Some men have the testicles drawn up, by the contraction of the Cremaster Muscle, into the lower part of the abdomen, so as to be invisible, and some even have control over this muscle so as

to be able to draw up one, or both, at pleasure. Such cases have deceived even medical men, who have testified there were no testicles. A case is related of a man who, when it was sought to affiliate an illegitimate child upon him and charge him with its maintenance, endeavored to prove that he could not be the father, as he had no testicles. He had drawn them up in the manner above described, but in this case the trick was discovered.

CHAPTER VIII.

EMASCULATION, CASTRATION AND EUNUCHISM.

FROM the earliest times various expedients have been resorted to to deprive men of their natural power of procreation, or to remove the desire of it.

The wish to do so seldom, or never, arose from any adherence to the doctrine of Malthus, that the earth is likely to become overpeopled, and the children of men to suffer in consequence (though it is said that the Hottentot men voluntarily removed one testicle, under the belief, quite a mistaken one, that they would thereby avoid the danger of having twins in the family), but from various notions of religious or moral benefit; from a desire to have servants who should be sufficiently attached to their master's interest, and who should not poach on the preserves of their master's Harems; from the wish to preserve the soprano voice of the young boy chorister from degenerating into manly bass, and for various other reasons.

The purpose was usually accomplished by the removal of the testicles only, though some nations, the Chinese for example, make a clean sweep of testicles, scrotum and penis. Sometimes nothing was removed, but the Vas Deferens was severed, or tied by a strangulating cord so as to prevent the passage of semen from the testicles, and in some cases the organs were merely tightly bandaged, and kept so until they atrophied or shrunk away into worthlessness. Some nations accomplished the same result by putting the person who was to be eunuchized through a course of persistent virility-destroying Onanism, or masturbation.

The word Castration is said to be derived from the tradition that the Castor, or Bearer, whose testicles formed an article of Commerce, became aware that his life was sought by hunters merely to obtain them, and he accordingly, when closely pursued, in order to save his life, tore out the coveted testes with his teeth and threw them to his pursuers. Hence we have the word *castrate*, from the Latin *Castorare*, to do as the Castor does.

Religious reasons have furnished a great many of the cases of Eunuchism. Some ancient heathen priests, in a spirit quite the

reverse of that which animated most heathen worship of the time, emasculated themselves by compression, and their example was followed in early Christian times, by the Monks of Origen. For many centuries, and indeed the idea is by no means yet extinct even in European and American religious communities, it was thought that the wrath of the Deity could best be appeased by sinful man, and his favor best purchased, by a course of persistent self-denial of those things man's nature most craved. Accordingly we find men living on the most meagre and unpalatable, even disgusting, foods, wearing the poorest and most uncomfortable clothing, or even corroding chains, or distracting hair-cloth next the person, living in damp, chilly and rheumatism-producing caves, or on bare rocks, or, as St. Simeon Stylites, on the top of a pillar, or beating themselves with whips, as the Flagellants of later times, to give themselves as much pain and deprive themselves of as much pleasure as possible, hoping thereby to win heaven.

With such ideas of God's demands, and in a people warm-blooded and sensual, it is little wonder that it was frequently thought their duty to give up what they considered the greatest pleasure of all, sexual intercourse. From this idea arose the old orders of Monks, sworn to eternal celibacy and chastity, and their successors in that idea, the priests of the Roman Catholic Church. In order, then, to remove from themselves both the power to take this indulgence, and the desire for it, the practice of self-castration was adopted. Even in modern times men have been driven by a religious mania to the same act. Sernin mentions the case of a young French priest who castrated himself with a pair of scissors, and nearly lost his life by the consequent loss of blood; and Dr. Lyon tells of a ship's cobbler on an American man-o'-war, then lying in the harbor of Havre, in France, who inflicted a similar mutilation on himself while in a fit of religious frenzy. Self-castration is still practiced by a religious sect in Russia, called the Skoptsey. The Christian Church, however, has never sanctioned eunuchism, and when Paul speaks of some who "have made themselves Eunuchs for the Kingdom of Heaven's sake," he probably means only that they adhered throughout life to a self-imposed and absolute celibacy, and abstinence from carnal intercourse.

Some savage nations habitually make eunuchs of all prisoners captured in war, so as to effectually prevent any intermingling of blood with their own nation. But in the case of cannibal victors,

the purpose went further, and they castrated prisoners for the same reason that farmers castrate their cattle, sheep, pigs and sometimes fowls, to make them fatten better and furnish a better quality of food. It is well known that the flesh of *entire* male animals is usually rank and disagreeable, particularly if slaughtered during the Rutting season of the female, when the male is usually under strong sexual excitement, the peculiar aroma being strongly perceptible as soon as the meat begins to be cooked. This is also the case, to a considerable extent, with the flesh of the female also, if killed at that period. And for this reason, and to promote fattening, it is with many stock farmers a common practice to castrate the female animals as well as the male, especially those species which Rut often, as sows. This operation consists in the removal of the ovaries, and is called Spaying.

The practice of employing Eunuchs as attendants upon the Harems of Oriental potentates, is too well known to require particular attention. For this purpose those were preferred in whom the emasculation was perfect, and the testicles, scrotum and penis all shorn away, for in this case only did the master feel that his Harem was absolutely safe from invasion of his exclusive privileges. Bisson mentions that on one occasion he saw the Chief Eunuch of the Grand Cherif of Mecca—a large, finely proportioned black—on his way to Constantinople for trial and sentence; he was heavily chained and well guarded. It appears that the attempt was made to castrate him in infancy, but the testicles had not descended, and the only result was to make such a scar on the Scrotum as gave him the appearance of being castrated. In this condition he seems to have kept perfect control of himself and his passions until made Chief Eunuch of the Cherif. Then the habitual association of the really strongly sexed and well developed masculinity of the warm-blooded Soudanese, and the seductive beauty of the members of the Harem, seem to have proved too much for both. The forays of the supposed Eunuch were not suspected until a blonde Circassian of the harem unexpectedly presented the Grand Cherif with a fine mulatto-looking son, when suspicion was, of course, aroused. The Chief Eunuch was watched, and it was found that he had corrupted every member of the Harem, and the entire lot were, after the off-hand Oriental fashion, put into sacks and drowned. The Sultan's laws, however, gave no such power over the Chief Eunuch, a

high officer of state, and he had to be sent to Constantinople to be tried.

Complete emasculation invariably produces a great change in the appearance and character, even if performed after manhood is reached, the voice becoming shrill and feminine, the beard disappearing, the figure rounding out in curves, like that of the female, and the whole appearance and character becoming distinctly woman-like. And where it takes place in childhood, the period of puberty is never reached, the voice remaining a high soprano, like that of the boy. For this reason the practice grew up in Italy of castrating chorister boys, that they might continue to take the soprano parts in music, the direction given by Paul that the women were not to be heard in the Church, being understood as forbidding them even to sing in the choirs. Also boys were castrated so as to enable them, when grown up, to take the female parts in comedies. This practice prevailed, it is said, at an earlier day, among the Oriental Christian Churches, and for the reasons above mentioned.

Besides those cases in which castration has not really been performed at all, such as that of the Chief Eunuch just cited, there are others in which, though the procreative power is gone, yet the desire of and capacity for copulation and the general virile appearance of the man remain. This is usually the case where the castration is performed after manhood has been reached, and nothing has been removed except the testicles alone, the Epididymis, Vasa Deferentia, Penis, etc., remaining. Of this sort, or in some cases, perhaps, like that Chief Eunuch, probably were those Eunuchs who held and filled with signal ability the highest offices of state, or led armies to victory, such as Daniel under Darius, and the Chief Eunuchs of Alexander the Great, the Ptolemies of Egypt, Lysimachus, Mithridates, and many others. Of this sort, also, probably were those Eunuchs who, a certain historian tells us, were acceptable to the Roman Matrons in the days of Rome's luxurious and vicious decline.

Of this sort was the Italian Opera Singer, Velutti, mentioned by M. Mondat. This man was, when a child, castrated by his parents, both testicles being removed, to fit him for a chorister in the Papal Chapel at Rome. Yet he became as great a favorite with the ladies as many a tenor singer and actor of the present time, and with a result fatal to him; for when in London he

formed a *liason* with a young Englishwoman, and indulged in such venereal excess as quickly brought him to his grave. He was passionately fond of women, and was able, though, of course, unfruitfully, to perform the act of copulation. Stock-breeders are well aware of the fact that leaving in the Epididymis on castration of horses, etc., leaves the gelding with a great deal of the masculine appearance of the stallion, and with almost a stallion's sexual propensities. Such an animal is said to be "cut proud." The fate of Velutti is characteristic of these copulating Eunuchs. Any venereal excess, even such as would but slightly affect an "entire" man (and such Eunuchs are very prone to indulgence if opportunity offer) is apt to speedily destroy their constitution and cause their death.

It would seem that, where castration has been performed after manhood has been attained, and only the testicles have been removed, leaving the Epididymis, etc., a good deal of semen may remain in the Epididymis, Vasa Deferentia, and Seminal Vesicles, so that at first, or even in some cases for a long time, the person may not only continue capable of copulation, but may even beget children. Sir Astley Cooper, the celebrated English physician, in his work on "Diseases of the Testes," mentions the remarkable case of a patient of his, as follows: "For nearly the first twelve months he stated that he had emissions *in coitu* (during coition), or that he had sensations of emissions; that then he had erections and coitus at distant intervals, but without the sensation of emission. After two years he had erections very rarely and very imperfectly, and they generally ceased immediately upon the attempt at coitus. Ten years after the operation he said he had during the past year been only once connected. Twenty-eight years after the operation he stated that for years he had seldom any erection, and then that it was imperfect." It would appear that in some cases, such as this, the stimulating presence of the semen, which had been left in the Seminal Vesicles, etc., is necessary to induce a perfect erection, and when that is all expended no more perfect erections take place.

Where castration is properly performed by a skilled surgeon, under proper conditions, no danger whatever attends it. The farmer castrates his pigs and calves, pours on a little turpentine, coal oil, or other simple antiseptic, and lets the animal go without even a bandage, and in two or three weeks it is perfectly healed,

not one case in a hundred causing any further trouble. And scarcely more danger attends the operation on a human subject, when properly performed. Yet, in making the Eunuchs so much prized in Eastern lands, the waste of human life is absolutely frightful. The Soudan furnishes annually to the Eunuch market about three thousand eight hundred eunuchs. Part of these are brought, when children, over the Soudanese border to the apothecaries, and others engaged in the manufacture of Eunuchs in Egypt, who resort to Khartoum to purchase them, and by whom they are castrated by removal of the testicles only, with an average mortality, consequent on the operation, of about thirty-three per cent. These simply castrated eunuchs sell for about two hundred dollars. But the great eunuch factory of that country is a Coptic Monastry on Mount Ghebel-Eter, and the operators are the Monks. The building is a large square structure, on the ground floor of which the operating room is situated. Here they manufacture both grades, the cheaper grade already mentioned and the highly-prized, completely denuded sort, in whom all the external organs are taken away, who sell for seven hundred to one thousand dollars apiece. These Coptic Monks furnish Eunuchs to the slave markets of Constantinople, Arabia, and Asia Minor, and do a thriving business. Little African children, taken by the Arab slavers in their bloody slave-catching raids, are brought here in large numbers.

In this primitive surgical institution, the manner of performing the operation, and the after treatment of the unhappy victims, are as barbarous and revolting as the practice itself. Remondino describes it as follows: "The little, helpless, and unfortunate prisoner or slave is stretched out on an operating table; his neck is made fast in a collar fastened to the table, and his legs spread apart and the ankles made fast to iron rings; his arms are each held by an assistant. The operator then seizes the little penis and scrotum, and with one sweep of a sharp razor removes all the appendages. The resulting wound necessarily bares the pubic bones, and leaves a large, gaping sore that does not heal kindly. A short bamboo cannula, or catheter, is then introduced into the urethra, from which it is allowed to project for about two inches, and no attention is paid to any arterial hemorrhage; the whole wound is simply plastered up with some hæmostatic (blood-stopping) compound, and the little victim is then buried in the warm

sand up to his neck, being exposed to the hot, scorching rays of the sun; the sand and soil are tightly packed about his little body so as to prevent any possibility of any movement on the part of the child, perfect immobility being considered by the Monks as the main element required to promote a successful result. *It is estimated that thirty-five thousand little Africans are annually sacrificed to produce the Soudanese average quota of its three thousand eight hundred eunuchs.*

"When this immense sacrifice of life (to say nothing of the probably five times as many who are killed during the attack on the raided villages, or who drop down and perish on the way to market), the useless barbarity, and the real needlessness of such mutilated humanity existing, are fully considered, it would seem as if Christian nations might [Ed.—They do, especially Britain, at the present day interfere with great diligence and much abatement of the evil], with some reason, interfere in this horrible traffic, by the side of which ordinary slavery seems but a trifle. When we further consider, that in some instances the child is also made mute by the excision of part of the tongue,—as mute or dumb eunuchs are less apt to enter into intrigues, and are, therefore, highly prized,—the barbarity, cruelty and extremes of inhumanity that these poor children have to suffer cannot be over-estimated. Neither must we be astonished at the stolid indifference that is exhibited by the eunuchs in after life to any, or all, sentiments of humanity, or that they should hold the rest of humanity in continual execration."

Remondino also warns the civilized public against unintentional self-emasculation, and his remarks are worth repeating here. "Modern civilization, and its unnatural mode of dressing, inflict great harm on men by keeping these parts too warm and constricted. Much of the irritability of these organs, as well as their *decadence* at an age, some generation or two before the time when they should still possess all their virile attributes, can be directly attributed to this cause. A more intelligent way of dressing would result in less moral and physical wreckage, and require less galvanic belts and aphrodisiacs (medicines or treatment to excite sexual power or feeling) in men under fifty. If those who habitually swath their scrotums in the heavy folds of their flannel shirts, to which are superadded the cotton shirts, drawers, and outer clothes in which civilized man incases himself, would cast a back-

ward eye into the dim and misty past and see the priests of some of the old Pagan Gods soaking the scrotum in hot water and then gradually rubbing the testicles within by gentle but firm friction, *to make the testicles disappear,* a process by which many of the heathen priests prepared themselves for the discharge of their sacerdotal duties, and the strict observance of those rules of chastity and celibacy which they were henceforth to live up to, they would find *one* explanation of why civilized man does not possess that vigor and retain that procreative power into advanced age that was one of the characteristics of our ancient progenitors in the days that breeches were as abbreviated as those now worn by the Sioux Indians. These are really but leggings, which run only to the perineum, and are simply tied at the outer points to a strap from each hip. Finely and comfortably cushioned chairs may be a luxury to sit on, but they will have, on the man who uses them in youth and in his prime, a wonderful sedative and moral influence later on, about as effectual as the miniature warm baths for the scrotum and gentle pressure to the testicles that were used by the heathen priests of old, who preferred a gradual disappearance of the glands to the too sudden and summary methods of the Cybelean clergy, who used a piece of shell and an elaborately performed castration. According to Paulus Ægineta, this was a common practice of making Eunuchs out of young boys in the Orient, the mortality being hardly any; whereas the complete removal of all the external organs, the favorite method for making harem guards and attendants, and more suited to the jealous disposition of the Turk, has a mortality of three out of every four, according to Chardin, two out of every three, according to Clot Bey, the chief physician of the Pasha, and of nine out of every ten, according to Bisson. So prone to reach high offices were intelligent eunuchs, that it is related that parents were at times induced to treat their boys in the manner above stated, that they might be on the highway to royal favor, honor and rank; such is the ennobling tendency of Oriental despotism, polygamy and harem life. On the same principle, Europeans subjected their boys to a like operation, to fit them for a chorister life, or the stage, where fame and honor and wealth were to be found."

In some countries various curious practices are, or have been, resorted to to secure temporary, if not permanent, sexual abstinence. A number of them are described in Remondino's interest-

ing book on "The History of Circumcision." Of these practices, the most common was that called Infibulation. This consisted usually in drawing the foreskin down over the Glans Penis, inserting a large ring through it, of gold, silver, or iron, then welding together the free ends of the metal. This, of course, effectually prevented copulation, so long as it was left on, which in some cases was only temporarily, while in others, as the Greek Monks of Mount Athos, in Asia Minor, it was worn till death. The practice was, perhaps still is, quite common in some of the American Tribes of Mexico, Central America, and South America. And in ancient times it was not uncommon for athletes, gladiators, singers, comedians and dancers to be thus infibulated, this restraint from sexual indulgence tending to the better development of voice and muscle. A somewhat similar practice has prevailed in various countries to insure the chastity of women. It is said that in Ethiopia, when a female child is born, the vulva is stitched together, allowing only the necessary passage for the need of Nature. These parts adhere together, and the father is then possessed of a certified virgin, whom he can sell to the highest bidder, the union being severed with a sharp knife just before marriage. It is said also, that in some parts of Africa the virgins wear a ring through the labia, which can only be removed by a file or chisel, and this is not done till just before marriage. The Married women wear a sort of muzzle, fastened with a padlock, the key to which is in the possession of the husband. In some cases it takes the form of a belt, fastened around the hips and covering the abdomen, and studded on the outside, over the abdomen, with sharp spikes to keep off intruders.

CHAPTER IX.

THE SEMEN.

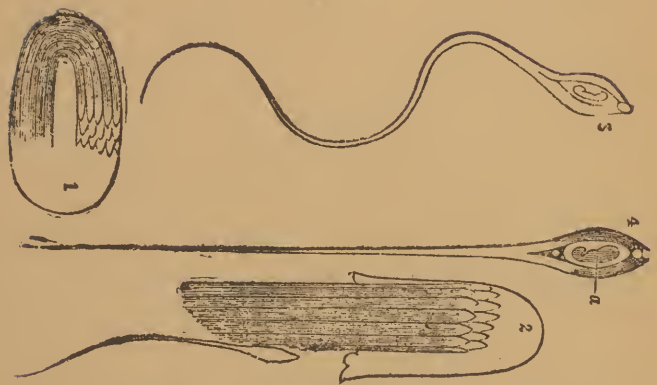
THE male element in production is called the *Semen* (Latin—seed). This is the product of various glands, the first and most essential being the testicles. In appearance it is a yellowish white, thick, semi-fluid substance, and somewhat mucilaginous in character. When freshly expelled from the organs, it seems to consist of two parts, one quite thick, like half dissolved starch, and the other thinner and clearer, but after exposure to the air for a few minutes these parts seem to melt together, and to be all quite fluid. When mixed with water the fluid part is quickly dissolved, leaving the solid part floating, or adhering, to the sides of the vessel as minute, greyish white, curdy grains. The chemical composition of the semen is more like that of the brain and nerve substance than like that of any other part of the body. Roughly, it may be said to consist of ninety per cent. water, six per cent. animal mucilage, three per cent. phosphate of lime, and one per cent. soda. The active, living principles of the semen are certain minute living individual organisms, called Zoospermes, or Spermatozoa (Greek—Sperma, seed, and zoon, an animal), or Seminal Animalculæ.

An examination of the semen in its earliest stages, with a sufficiently powerful microscope, reveals the presence of minute cells floating in a thin fluid. These cells gradually develop and enlarge till it can be seen that each contains six or eight smaller cells floating in a fluid within the larger cells. Still later, within each of these smaller cells there will be found a single Animalcula, very young and small, coiled up within its narrow house. Soon these smaller cells break, and the Animalculæ within them are at large in the larger cell and swim freely about it. Next, these larger cells also break, and the Animalculæ go about at their will throughout the whole extent of the semen then existing. This is to them a good-sized feeding and playing ground, for they measure, when fully developed, only about one six thousandth of an inch in breadth at the widest part, and about ten times that distance in length. These cells, in which the Spermatozoa are developed, are called the Seminal Granules.

PLATE X.

Fig. 1.

Fig. 2.



FORMS OF SPERMATOZOA, OR SEMINAL ANIMALCULÆ.

Fig. 1. *1*, Is the Spermatozoon of the Sponge. (The Sponge is popularly thought to be vegetable, but it is animal. The Sponge of commerce is what we may call the *skeleton*, the jelly-like animal substance having been washed out in preparing it for use). *2*, Medusa, a kind of jelly fish which swims, with an umbrella-like covering, on the top of the water in the ocean. *3*, Bothriocephalus, of the Tape Worm class. *4*, Cleta (Chætopod), of the Earth Worm sort. *5*, Ascaris; to this family belong the round, or Pin Worms. *6*, Moina (Daphnid), as the Water Flea. *7*, Crab. *8*, Lobster. *9-11*, Plagiostomum (Sharks, etc.) forms, with elongated nucleus. *12*, Salamander. *13*, Ray (a family of fishes, including the Devil-fish, Skate, etc.). *14*, Man. *15*, Cobites, (a family of fishes, including the Gudgeon). *16*, Mole. It will be noticed, that to the ordinary observer the appearance of the Spermatozoon gives little idea of the animal from which it is derived.

Fig. 2 shows the human Spermatozoa still more magnified. *1*, Is a bundle of them, as found in the testicle; *2*, shows them emerging from the containing cell, (these two, unfortunately, are very crude drawings, and convey the idea but dimly); *3*, is the perfect Spermatozoon, and *4*, is the same colored, to show its parts more clearly; *a*, in *4*, is probably the stomach of the Spermatozoon, though it resembles very much in shape the foetus in its earliest stages. The white dots at the point are suckers, with which it attaches itself to any object, and through which it probably takes its food.

In different animals the Spermatozoa vary greatly in size and shape, as will be seen on looking at Plate X., but in some form or other they are always present in the semen of every fruitful male animal.

The various plates and cuts accompanying this and following chapters, with the subjoined explanations, show the shape, character and development of these germs.

They consist of an oval body pretty well pointed at each end, like a peach stone in shape. The sharper end is produced as a long thread-like tail. With this the creature is able to propel itself, darting about with great rapidity, like a fish in water. Until the semen reaches the Seminal Vesicles and has their secretion added to it, the Animalculæ seem listless and inert, but after the vivifying food or stimulus of the Vesicles is mixed with the semen they dart about in the liveliest manner. At the head is a spot, represented by the white dot in the cut, which is a sort of mouth or sucker, by which it is able to attach itself to any object, and by which it probably takes its food. Their remarkable power of locomotion, and their disposition to move straightforward in any course, enable them, even when merely introduced into the Vagina of the female, to find their way upward through it and through the womb, and even through the Fallopian Tubes, to the ripened and expelled egg, wherever it may be found.

Their tenacity of life is quite remarkable; the Spermatozoa of some animals will live and be active for several days, or even months after injection into the body of the female, so that as conception may occur whenever one of them meets the ripened egg, it is not easy always to know the precise moment, or even the very day from which to reckon the duration of a pregnancy. The semen has even been frozen solid and so remained for four days, and upon thawing the Animalculæ were found as lively as ever.

There are none of these Spermatozoa found in the secretions of the male before the period of puberty (about the age of from eleven to eighteen years), nor after old age destroys the manly powers. Some diseases have the effect of destroying them, as have also certain drugs.

The Spermatozoa were first discovered by Hamm, when a pupil of Leeuwenhoek, in the year 1677. He called the master's attention to them and they observed their movements. They were long considered mere parasites and not a necessary part of

the semen, though the discoverers seem to have thought differently, for they gave them the name they now bear—Spermatozoa (Greek—animal seed). Even as late as 1835, Von Baer maintained this erroneous theory, though Prevost and Dumas, in 1824, had shown that the fertilizing power of the semen was lost when these Animalculæ were removed by filtration. Subsequent observers, up to 1854, made further discoveries regarding them, and learned that they entered the ovum of the female, but until 1875-6 it was supposed that there they merely disappeared, distributed throughout the yolk, and thus imparted vitality and power of development to it. However, the advance of microscopy, the invention of more powerful microscopes and a better knowledge of how to use them, enabled Van. Beneden and O. Hertwig, in 1875-6, to show that the Spermatozoon which enters the egg does not disappear, but remains as the male pronucleus, or germ, which unites with the female pronucleus to form the embryo of the future being, as will be explained in the Chapter on Impregnation.

The Spermatozoa originate in the testicles. Just how they originate there is unknown. At the earliest observable period they are mere cells, like minute eggs, six or eight of these being contained in a larger cell. As these cells develop, the embryos of the Animalculæ, or Spermatozoa, appear in them as a little dark spot in each. After a time the spot becomes a small spermatozoon. This soon grows and bursts its cell, in fact, we may say, is *hatched*. Some physiologists contend that these cells, from which the Spermatozoa are hatched, are the eggs of the developed spermatozoa; that these latter are differentiated into male and female, and that the female is fecundated by the male and produces these cells as impregnated ova. This, however, I consider improbable for the reason: first, that though closely studied, and observed in all their moods and movements, they have never been seen to copulate; second, that when they leave the testicles, where these cells are found, the Spermatozoa are quite inactive, and show no sign of passion or scarcely of life, and only become lively after the semen has added to it the secretions of the seminal vesicles; these lively spermatozoa never return to the testicles, and the cells referred to are never found anywhere else. The true origin of these cells, which appear to have an individuality of their own, and from which are developed the Spermatozoa, each having a separate individual life and will of its own, is still wrapped in mystery.

Small as these beings are, their length being no greater than the thickness of thin tissue paper, and their greatest width only one-tenth that distance, their character and habits have been accurately observed.

It is noticed that they shed their skins from time to time; that they have great power of locomotion, darting about in the seminal fluid with wonderful quickness; that sometimes a group of them will put their heads together and move forward side by side like a line of soldiers; that they may move in a comparatively large circle but always forward, never either moving directly backward or turning about and retracing their way; that sometimes one attaches itself to some object by the sucker, or mouth, with which it is furnished, and adheres to it until death; that sometimes they appear to engage in combat and fight till one is killed or disabled. (Perhaps some person, a cripple from the time of his birth, may owe his condition to the fortune of war, which overtook his ancestral spermatozoon in the loins of his father).

This tendency to push straight forward in spite of obstacles, like a pregnant salmon ascending a stream to her spawning bed, is an important factor in impregnation, for the result is that when the semen is deposited within the vagina of the female, or even within the external lips of the vulva, the lively animalculæ sometimes make their way up far enough to meet and impregnate the female egg. The Spermatozoa of men in the prime of life are more vigorous than those of the youth just after puberty, or of the aged just before the failure of their fecundating power. Also those of some men are livelier than those of others. This explains why some men are much more likely to become fathers than others. The same difference of procreative power is also noticed between different males of the same species amongst the lower animals. In the semen of some men these spermatozoa are entirely wanting, though they are apparently well formed and have the power of erection and coition. In such cases the man, though not impotent, is sterile. There is no doubt, then, in many cases, in which the absence of children is laid at the wife's door, the real sterility is in the male, whose semen is devoid of the life germs, the Spermatozoa. An examination of the semen by a competent microscopist will immediately discover whether the husband is, or is not, the sterile one. An examination of the ova, the special generative element of the female, is much more difficult, as they are gener-

ally broken up and destroyed before reaching the Vagina, where first they might be obtained for examination.

In cases of alleged violation of female chastity, the medical examiner seeks for the presence in the female organs of these Spermatozoa, and if the violator be not sterile they will always be found; if within about twenty-six hours then alive, but even later, they will still be found, though probably in a dead and dried up condition. Opinions, however, vary as to this length of life.

Such drugs as Opium, Strychnine, Arsenic, Prussic Acid and Iodine, if brought into contact even in the smallest quantities with the semen, will destroy the Spermatozoa, producing in them symptoms similar to those produced by the same poisons in the developed human being. For this reason an extremely attenuated solution of one of these drugs is sometimes used to inject into the female organs immediately after connection, so as to destroy the Spermatozoa and prevent conception. Cold water also destroys them, and is also sometimes used for a similar purpose. All these expedients, however, are dangerous to be used, and should never be tried except under the special direction of a competent and reliable physician, and great injury may follow any unskilled use of them, as indeed will follow the use of most means recommended for the purpose, and the only proper and natural way to prevent conception is to avoid sexual intercourse. Of course there are some cases, as where a husband insists on his marital rights, and the wife is worn out with child-bearing, or child-rearing, and unfit presently to assume the burden of another pregnancy, when it seems not improper on her part, as we may say in self-defence, to use some uninjurious means to prevent conception.

Warm water does not destroy them, and if a little sugar be dissolved in it, will even prolong their life. But if a very little quantity of alcohol be added to the warm water the effect is precisely similar to the effect of alcoholic drink on men. If the proportion of alcohol be too large it kills them outright at once, as it would a man, some dying in convulsions. Also, if the alcohol be less, the Animalculæ become much excited, and dash about in a perfect frenzy. Some will whirl rapidly about till in a short time death ensues. Some become very pugnacious, and fight with drunken fury till many are slain. As the effects pass off, and the alcohol is mostly removed by dilution and filtration, those which survive are found to be dull and stupid for some time. Many

constant drunkards are impotent from the reasons above suggested, the alcohol taken into the man's system reaching the semen in sufficient quantities to produce the same results as if mixed directly with it, as in the foregoing experiment. The fact that most confirmed opium-eaters are sterile is attributable to a similar cause. The use of Iodine on the scrotum, where it is sometimes used to allay inflammation and reduce swelling, is highly improper, as it is liable to prevent the development of the Spermatozoa, and probably by that means cause the testicles to waste away. There is no doubt that the imprudent use of these various drugs in childhood, or later, is responsible for many cases of imperfect development, or later impairment of the sexual powers, in both males and females, as the drugs have a very similar injurious effect upon the ovaries and ovi-product of the female. The use of Tobacco also has a greater or less evil effect upon the Spermatozoa, depending on the degree of excess in which it is used and on other circumstances, and injured or imperfect animalculæ are sure to be the progenitors of stunted, deformed, or diseased children.

Electricity, except in the very lightest imaginable current, kills the Spermatozoa as surely and suddenly as the electric death chair in Sing Sing Prison despatches its victims.

Before the age of Puberty the testes secrete no semen; there is seldom any discharge from the male organ, except the urine, and even in those cases in which a slight mucous discharge appears, it is not semen and contains none of the Spermatozoa. At from about eleven or twelve to eighteen years of age the little cells in which they are developed begin to appear in the testes, which begin to increase rapidly in size, as the cells with their contained germs develop. Hair begins to grow out on the Pubes, about the root of the Penis, and on the Scrotum; also in the armpits, and the down grows longer and thicker on the face, and hints at an approaching beard. The voice first becomes cracked, strange and croaking, then develops into the tenor or bass of the adult. The boy is becoming a man. The care of a boy at this period is only less important than that of the girl at the dawn of her womanhood, and will be treated in a subsequent chapter.

As the period of puberty progresses, the semen is secreted in gradually increasing quantities, and the Spermatozoa begin to appear in it, in increasing numbers, to the age of perfect manhood.

In some cases they are found at a very early age, some boys having perfect Animalculæ in semen as early as ten years of age, and a case is mentioned by Hollick in which a boy of eleven became a father. In other cases they have not appeared till upwards of twenty years of age. The boys of warm climates usually develop earlier than those of cold countries, and, nevertheless, retain their sexual vigor longer. Various other circumstances, which will be dealt with in the Chapter on the Hygiene of Male Puberty, also retard or hasten Puberty.

In old age the number of Spermatozoa in the semen becomes less and less, till at length none are found. The age at which they disappear, and the individual loses permanently the power of procreation, varies greatly in different persons, some men becoming sterile as young as fifty years of age, while, on the other hand, the old gipsy in Guy Mannering, who became the father of a number of illegitimate children after he was a hundred years old, is no mere fancy picture. The author was acquainted with an old man in London, Canada, who, when nearly eighty years of age, seduced a young woman who was engaged to another man, and she conceived by him. He afterwards married her and had several children by her.

The Latin historian, Sallust, relates of Massinnissa, King of Numidia, that he married at the age of eighty-five years, and had a vigorous infant born to him after that time.

A Frenchman named De Longueville married his last wife when he was ninety-eight years old, and had a son by her when he was one hundred. He died at the age of one hundred and ten.

A Tyrolese nobleman, named Baravicino de Copellis, married, at the age of eighty-three years, a young and healthy woman, and had *eight children* by her. He died in 1770, aged one hundred and four years.

The case of Abraham, the ancestor of the Jewish race, whose first son by his wife, Sarah, was born when the father was one hundred and the wife ninety years of age, is remarkable for the great age of both parents.

The oft-cited case of old Thomas Parr, of Shropshire, England, is a very remarkable one. This man, when about one hundred and twenty years of age, married his second wife, and died at the age of one hundred and fifty-two years. She only lived with him till he was one hundred and thirty-two, and, though she

bore him no children, she asserted that he showed no sign of the virile incapacity usually attendant upon age.

In a subsequent chapter we will consider the causes which hasten or retard the decay of the sexual powers in man.

The perfect semen contains a great number of these Spermatozoa, a single emission containing many hundreds, each of which, if it found and reached a separate female ovum, could become the progenitor of a new being. Usually, only one of these, even on that copulation which produces conception, enters the egg and fertilizes it, all the rest, as well as all those contained in other emissions, die and are wasted.

As appears by the Plate at the beginning of this chapter, the forms of Spermatozoa differ very widely in different animals, though always pretty much alike in individuals of the same species. The ova of each species are only adapted to receive the spermatozoa of that species, and for this reason a male and female of totally different species will seldom produce young, though copulation take place. Even in those cases in which different species do breed, the young are usually imperfect in some respect. The best known example is that of the mule, the offspring of a jack-ass and a mare. The mule, it is well known, though capable of copulating, and even ejects a semen-like substance, is completely sterile, the emission being void of any animalculæ. The female mule, also, is always barren

CHAPTER X.

SEXUAL UNION.

THE means, or methods, whereby the male and female sexual elements, the semen and the ovum, are brought together, so that they may coalesce, develop and form the new being, vary a good deal in different species. In most mammals (milk-giving animals) and in some others, there is true copulation, the male organ entering within the body of the female and there emitting the semen, while in most birds the male organ is a mere prominence, like a button, and does not enter the female at all, but ejects the semen upon or into the mouth of the female sexual organ. In such cases the females have no true vagina, one aperture (called the Cloaca) serving for the excretions from the bowels, bladder and ovaries, and for the reception of the semen. In most fishes and in frogs the eggs are not impregnated within the body of the female at all, but after expulsion. The male fish merely sheds his semen into the water amongst the eggs which have just been laid there in great numbers by the female, and the two coming into contact, the eggs are fertilized. The male frog twines his long, arm-like, forelegs around the body of the ovulating female, and, squeezing very tightly, assists in the expulsion of her burden of eggs. As they pass out he deposits his semen amongst them, and thus fertilizes them.

By a wonderful instinct, which the Creator has implanted in all living beings, he has provided for their reproduction. That instinct is the desire for and disposition to sexual union. The young of all animals, after reaching a proper age, not only feel that sexual desire, but naturally, sometimes unconsciously, practice those modes of physical union which only will properly gratify those desires. In former times, it was a matter of discussion amongst philosophers whether two young people of opposite sexes, who have never seen or heard of the manner of sexual union, would practice it, and what causes would lead to such practice. But the act of copulation, under proper conditions, is evidently as instinctive as the act of feeding. The newly-born infant will seize the breast to nurse, and perform the act of suction, without requiring previous instruction by word or example; and the

nerves of the genital organs impel as instinctively to the act of coition to satisfy the sexual hunger. This is the case with all sorts of animals, from Man down to the lowest forms of life.

This sexual hunger, which is more than the mere expectation of pleasure, impels the male and female as really and almost as irresistibly to the means of reproducing the species and preserving the life of the race, as does the hunger for food to the means of preserving the life of the individual. But for this natural, God-implanted craving, many considerations would deter from the sexual act, even if its nature and purpose were well known; the fear of the pains of parturition, the inconveniences attendant upon the pregnant state, in some cases the pain, even danger, attending the act of copulation itself; the care, trouble, and expense of rearing children, all tend to discourage the act by which alone the life of the race is continued; and, but for the Divinely-given craving for sexual communion, there is no doubt that, in the vast majority of cases, the individual's interest in the perpetuation of his kind would be quite inadequate to off-set the considerations just mentioned. Indeed, there are many practices in vogue in civilized communities by which men and women seek to avoid the real, or imagined, inconveniences above stated, while still gratifying the instinct of copulation. Some of these means, whereby it is sought to cheat the Creator of the legitimate fruit of sexual intercourse, will be treated of in a later chapter.

Some of the various excitants of this sexual impulse may be mentioned. There is no doubt that the senses of smell, sight, hearing and feeling all have their influence, sometimes directly, sometimes through the memory and the law of association of ideas.

It is well known that in the lower animals the female, during the Rut, or Heat, emits a peculiar odor, which, coming to the nostrils of the male, immediately excites the sexual impulse in him, and attracts him irresistibly to the female. And even if the female be not present, the odor will, nevertheless, produce in him the same sexual excitement. Use is sometimes made of this fact to entrap animals. For example, the genital organs from a rutting bitch, or a cloth soaked in the excretions therefrom, have often been used with great success to attract wolves into pitfalls, and traps of various sorts, the smell of the secretion attracting the males irresistibly, though to their destruction.

It is highly probable that something of the same kind enters into the attraction which a female of the human race has for the male, there being a subtle but characteristic odor, which Zola calls "the odor of love" exhaled by the person of a well-sexed and healthy woman, which, consciously or unconsciously to him, attracts a properly constituted man towards her, as the steel is attracted to the magnet.

In man, too, the sense of sight undoubtedly exerts an influence, suggesting, though in most cases unconsciously and without any process of reasoning, mutual physical adaptation.

The operation of the sense of hearing in sexual attraction probably operates chiefly through the memory and law of association of ideas, persons of both sexes learning, though usually without thinking of it, that certain qualities and tones of voice pertain to persons of given age and sexual condition. At the same time there is no doubt that the sexual condition affects very strongly the nature of the vocal tones, and it is quite possible a certain degree of knowledge of that fact is instinctive, the voice attracting or repelling as surely and unerringly as the subtle odor of love, or the apparent adaptation of person.

The sense of feeling, also, is a powerful factor in awakening a sexual impulse, the touch of a lover sending, as every lover knows, an electrical thrill through every fibre of the moral and physical being, and exciting to the highest pitch the good or evil in the man and woman touched. And the pure man, who has clasped the hand of the pure woman he loves, has, without excitement of the organs of sex, and with or without knowing that he has sworn it, sworn eternal fidelity to all that is high and noble and holy, to do all, to dare all, and to suffer all, for her sake. Some contend that there is a peculiar magnetism in the touch of of the genital organs of one upon any other part of the body of the other, whereby the other will know that the contact was with those parts; but it is doubtful whether, without any previous actual experience or knowledge, the person touched would recognize them. Probably in most cases, the distinctive influences of smell, sight, and hearing on the sexual desires or impulses, are not recognized by the parties themselves, but a certain influence of attraction is felt, which is probably the resultant of all those forces operating upon the sexuality, and this we know simply as the attraction of the opposite sexes for each other. It is never felt

between properly constituted persons of the same sex, nor by those in whom sexuality is entirely absent.

In Human beings, too, there are certain moral and intellectual sympathies and adaptations which draw given persons together. Where these exist, and physically the persons are suited to each other, their social intercourse and friendship, perhaps at first purely Platonic, are nearly certain to develop sooner or later the sexual desire; and it is this fact, that this desire in human beings for intimate association usually has its earliest origin in the moral and intellectual suitability of the parties for each other, which lifts the sexuality of man above that of the beast.

This it is also which makes a good deal of the difference between the degrading effects of promiscuous fornication, which is merely the gratification of animal sensuality, or the debased connection of a marriage for financial convenience, and the pure enjoyment of a marriage of moral and intellectual, as well as physical, love.

HYGIENE OF THE MARITAL RELATION.

The sexual desire, in well formed animals of every species, is present in those of both sexes. But in most cases this desire is much stronger in the male than in the female. And this is particularly the case with human beings. The late Dr. Napheys, of Philadelphia, with regard to passion in Woman, and the use and abuse of the Marital relation, writes as follows: "A vulgar opinion prevails that they are creatures of like passion with ourselves; that they experience desires as ardent, and often as ungovernable, as those which lead to so much evil in our sex. Vicious writers, brutal and ignorant men, and some shameless women, combine to favor and extend this opinion. Nothing is more utterly untrue. Only in very rare instances do women experience one tithe of the sexual feeling which is familiar to most men. Many of them are entirely frigid, and not even in marriage do they ever perceive any real desire. We have in numbers of instances been so informed by husbands, who regretted it, and were surprised at it."

Loose women, knowing that their business is increased if they feign the pleasure to be reciprocal, often give occasion for the opinion we are combating, in the minds of young and inexperienced men. As Mr. Acton well remarks: "There are many females who never feel any sexual excitement whatever; others, again, to a limited degree, are capable of experiencing it. The best mothers, wives,

and managers of households know little or nothing of the sexual pleasure. Love of home, children, and domestic duties are the only passions they feel. As a rule, the modest woman submits to her husband, but only to please him; and but for the desire of maternity, would far rather be relieved from his attentions."

This is doubly true of woman during the periods when they are with child, and when they are nursing. The whole force of the economy at these times is taken up with providing sustenance for the new being, and there is no nervous power left to be wasted in barren pleasures. In those exceptional cases where this does not hold good, every excitement is visited upon the child, and it has to suffer in health and growth for the unnatural appetite of the mother.

The above considerations, which all married men will do well to ponder, should lead them to a very temperate enforcement of their conjugal rights. They should be always considerate, and not so yield themselves to their passions as to sacrifice their love to the woman they have married. Let us here quote the words of Dr. Horatio R. Stover, of Boston, on these rights: "Restrained within due bounds as to frequency, they serve to give a charm to life, and to impart fresh courage for enduring its vicissitudes; but to gain these, one single rule must be observed. It is this: that the husband compel his wife to do nothing that she herself does not freely assent to. A forced union is even worse than solitary vice. No true conjugal enjoyment can exist unless it is mutual. The true rule is to take only what is freely given."

In a similar strain speaks the distinguished old English divine, Jeremy Taylor, in his excellent "Rules and Exercise of Holy Living": "Married people must be sure to observe the order of Nature and the ends of God. He is an ill husband that uses his wife as a man treats a harlot, having no other end but pleasure. The pleasure should always be joined to one or another of these ends—with a desire of children, or to avoid fornication, or to lighten and ease the cares and sadness of household affairs, or to endear each other; but never with a purpose, either in act or desire, to separate the sensuality from these ends which hallow it. Married people must never force themselves into high and violent lusts with arts and misbecoming devices, but be restrained and temperate in the use of their lawful pleasures.

"It is impossible, necessarily, to lay down any specific rules

for the government of others in this particular; but we may state generally that no husband should force his wife to submit to him against her will, nor should he even ungently persuade her; and, for himself, whenever he feels, immediately after the act, or during the next day, any depression, or debility, or disturbance of the health, it is a certain sign that he is over-tasking himself."

"There are certain periods when a complete cessation should be observed. One of these is during the monthly sickness of the woman, and for a day or two after that epoch." There may, however, be circumstances in which intercourse at this time may be quite proper, as for the pleasure of the woman in those rare cases in which that is the only time in which copulation gives her pleasure; or in which, as is sometimes the case, she will conceive at no other time. But under ordinary circumstances the practice is to be condemned.

"During pregnancy and nursing, conjugal intercourse should be as infrequent as possible. Some writers condemn it altogether, but this we consider an extravagance. They do no harm, providing that they neither, on the one hand, unduly excite the woman, nor, on the other hand, are repulsive to her. Where intercourse is had during pregnancy, it is apt to injure the growth of the fœtus before birth, and sometimes to provoke a miscarriage, and during nursing it is quite sure to injure the quality of the milk, to the serious damage, perhaps, of the infant. If the intercourse be repulsive, it leads to domestic unhappiness, loss of mutual respect, and sometimes to violent nervous excitement on the part of the wife.

"After a natural confinement, at least two full months should be allowed to elapse before the resumption of these marital relations, and if the labor has been an unusually severe or complicated one, it is prudent to entend this interregnum yet another month. And the same may be said in case of a miscarriage, which is usually much more injurious to a woman than a natural childbirth at full term.

"During and after the change of life, it is also important to observe an unwonted moderation. During that period any unaccustomed excitement of this character may be followed by flooding, and other serious symptoms, while after the crisis has been passed, the sexual appetite itself should wholly, or almost wholly, disappear."

EXCESS, ITS DANGER TO THE MAN.

Nor is it for the woman's sake alone that moderation in the indulgence of the sexual passion is counselled. The dangers to the man himself, who addicts himself to excessive venereal indulgence, are no less great than to her.

"The unmarried man who purchases at a high price, and rarely, the pleasures of illicit love, is generally supposed to be the only sufferer from excess in the venereal act. Far from it. He is by no means alone. More commonly than is currently believed, the married man has to settle an account for immoderate indulgence."

To quote the words of a physician of wide experience: "Too frequent emissions of the life-giving fluid, too frequent sexual excitement of the nervous system, is most destructive. Whether it occurs in married or unmarried people has little or nothing to do with the result. The married man who thinks that, because he is a married man, he can commit no excess, no matter how often the sexual act is repeated, will suffer as certainly and as seriously as the debauchee who acts on the same principle in his indulgence, perhaps more certainly from his very ignorance, and from his not taking those precautions and following those rules which a career of vice is apt to teach a man. Till he is told, the idea never enters his head that he has been guilty of great and almost criminal excess, nor is this to be wondered at, as such a cause of disease is seldom hinted at by the medical man he consults."

Excess in venery may consist either in brief but over violent sexual passion, or in a long-continued course of over indulgence more slowly but not less surely sapping the man's vital force.

It is vain to suppose that a few days' rest will restore the vigor which is too much trenched upon by a week or two, or a few nights, or even a single night's excess. The shock to the nervous system from so great a drain upon it, is such that its ill effects may not merely be felt for years, but the sexual system may never regain its former perfection of condition. The few days' rest may seem to restore it, but it is more seeming than real, and this fact is daily becoming better known to physicians.

Dr. Thomas Laycock, Professor of the Practice of Medicine in the University of Edinburgh, states, as a result of his observation, that "a great excess for a few days only, acting like a 'shock,' may manifest its consequences in the nervous system at

a long subsequent period. A sudden, short, yet great excess, may be more dangerous than more moderate, albeit excessive indulgence, extending over a long period. In certain constitutions, although only indulged in legitimately, and for a short period, as after marriage, such excess may act like a shock or concussion of the spinal cord, or like a blow on the head, and may give rise to serious chronic diseases, as epilepsy, insanity, and paralysis."

Indeed the well-known evil effects of the practice of the solitary vice, self-abuse, are due, not to any peculiar evil there is in solitary sexual passion, and its accompanying seminal emissions, in themselves, but to the frequency with which it may be, and usually is, indulged. And an indulgence in regular sexual intercourse, with equal frequency, brings exactly the same evils in its train. These evil results are described by Napheys, as follows: "Locally, there is over-excitation, irritability, and possibly inflammation. The digestion becomes impaired, dyspepsia sets in, the strength is diminished, the heart has spells of palpitation, the spirits are depressed, spermatorrhœa may arise, the generic powers lose their vigor, there is unusual sensitiveness to heat and cold, sleep is not refreshing, and a jaded, languid indifference takes the place of ambition.

"One of the most striking and characteristic effects is indicated in the throat and by the voice. There is a very close sympathy, and one not readily explained, between the voice and the procreative function."

Often an impairment of vocal power, dryness and hoarseness in the throat, chronic bronchitis, or a loss of volume and strength in the voice, is due to some disorder, or over-straining, of the masculine function, as well by excessive lawful indulgence as by self-abuse, or nocturnal losses. A vast amount of ill-health arises from this usually unsuspected cause, and a more careful consideration than is commonly given to this fact should lead a husband to a greater exercise of self-denial in marriage.

The causes which make excessive venery harmful are two—first, the waste of semen; as stated in a previous chapter, this fluid, and particularly the Spermatozoa in it, are of very nearly of the same composition as the brain and nerves; and the drain, caused by a two rapid and constant secretion of semen, leaves the brain and nervous system despoiled of those constituents of the blood, which should go to renew their substance, and both brain

and nervous system weaken from innutrition. Second, the severe and continued excitement of the nerves by sexual passion, even in those eunuchs who are capable of copulation, constitutes a strain of the system from which it recovers with difficulty.

Cases are related of extraordinary sexual power in men, and certainly some seem able to stand an astonishing degree of what, in most men, would be gross and dangerous sexual excess, without apparent harm. Yet, even in these cases, the effect is nearly sure to be felt sooner or later in a broken constitution and, perhaps, an early grave.

One celebrated case of sexual and general vigor often cited is that of August, called the strong, Elector of the Saxony, who was made King of Poland in 1697, and who was the father of three hundred and fifty-four illegitimate children. Notwithstanding the enormous physical vigor of this man, he died a lingering death at the age of only fifty-six.

Thomas Carlyle (History of Frederick the Great, Vol. II., p. 217) writes thus of this doughty monarch: "And August the Strong—what shall we say of August? History must admit that he attains the Maximum in several things. Maximum of physical strength; can break horse-shoes, nay, half-crowns with finger and thumb. Maximum of sumptuosity; really a polite creature; no man of his means so regardless of expense. Maximum of *Bastards; three hundred and fifty-four of them;* probably no mortal ever exceeded that quantity. Lastly, he has baked the biggest Bannock on record; Cake with five thousand eggs in it, and a ton of butter. These things History must concede to him. Poor devil, he was full of good-humor, too, and had the best of stomachs. His amputated great-toe does not mend: out upon it, the world itself is all so amputated and not like mending! August the Strong, *dilapidated at fifty-three*, is fast verging towards a less expensive country, and in three years hence will be lodged gratis, and need no cook or flunky of either sex."

Still more should a husband restrain his sexual appetite within the bounds of moderation for his wife's sake. Very many women lose their health, and some their lives, through the constant indulgence of their husbands. Dr. Storer, speaking of the diseases peculiar to women, says: "Among these diseases is a very large class occasioned, or aggravated, by excessive sexual indulgence." And every man should bear in mind that such excess is nearly

sure to beget injury, both to himself and to the woman whom he has sworn to cherish.

A quite erroneous belief prevails with some that frequent intercourse is necessary to health. Nothing can be further from the truth. So well was this fact understood by the ancients that their athletes and gladiators, in whom perfect muscular and general condition were essential, regularly abstained from all sexual intercourse whatever, their masters, indeed, sometimes muzzling them by the process of infibulation, that is, by passing a ring of metal through the foreskin of the organ of copulation and welding it there. "There is," says Napheys, "no condition of life more thoroughly in accordance with perfect vigor, than chaste celibacy. Next to this comes moderation in married life."

CHAPTER XI.

IMPREGNATION—CONCEPTION.

THE distinguished Zoologist, M. Felix Archimede Pouchet (1800—1872), laid down the following ten laws, which, he had concluded, after long and careful study, govern the process of impregnation:

POUCHET'S TEN LAWS OF FECUNDATION.

1. Generation is essentially the same in all beings, Mankind not excepted.

2. In all beings the Female Eggs exist before and independently of Conception, the same as the Male Semen does.

3. The Egg is never impregnated in the Ovary, or organ that produces it.

4. The Egg must always have attained a certain development before it can be impregnated, and must also have left the Ovary.

5. In all beings the Egg leaves the Ovary independently of Impregnation.

6. In all Animals the Eggs are emitted at certain regular periods peculiar to each, at which times there also occurs a peculiar excitement of the female organs.

7. Conception can never occur except when the Semen is present at the same time with the perfectly developed Egg

8. The Menstruation of the Human Female is strictly analogous to the periodical erotic excitement of other animals, sometimes termed the Rut, or Heat.

9. Conception is necessarily connected with Menstruation, and there is, therefore, in human females, a period when impregnation can occur, and one when it cannot, and those periods can be pointed out.

10. In the human being, Impregnation always takes place either in the Womb, or in the very end of the Tube next to the Womb.

By contemporaneous and subsequent investigations, other observers have confirmed most of the rules laid down by M. Pouchet, and they are now universally assented to, save that ex-

ceptions are cited to the Third law; and as for the Tenth, many physiologists assert that the Egg is usually fertilized *not* in the Womb, nor in the end of the Fallopian Tube next to the Womb, but in the remoter part of the Tube, or even in the Abdominal Cavity.

We will now repeat these laws, using them as a basis for the remarks which we make upon this subject.

The first law, namely, Generation, is essentially the same in all beings, Mankind not excepted, has been freely discussed in effect in the earlier part of this book. All animals arise from the union of two elements, the Male and Female, the Female element being the Egg, and the Male element being the Semen, which Fertilizes or Impregnates the Egg and makes it develop into the new being.

This Impregnation and Development vary somewhat in different animals.

In most cases the Impregnation takes place within the body of the female, though in a few, as in the Fishes and Frogs, the semen is deposited amongst the Eggs in the water, and there they are impregnated.

The variation in the place of development after impregnation is marked by the usual classification of animals into Oviparous, Ovoviviparous, Viviparous and Marsupial.

The Oviparous are those in which the eggs, though usually impregnated within the body, are further developed and hatched without. Of this class are most birds, turtles, etc.

The Ovoviviparous is a designation given to those whose eggs are impregnated within the body, but are developed and hatched as they are passing out. The Viviparous are those which bring forth their young alive, the minute eggs being impregnated within the body, and there developed. The difference between the Oviparous and Viviparous animals is thus humorously stated by Oliver Wendell Holmes: "*Viviparous* animals are a specie-paying lot, but *oviparous* ones only give their notes, as it were, for a future brood." The Marsupials are that class of animals in which the young are very imperfectly developed within the body, then are expelled and placed in a pouch adjacent to the teats of the dam, from which they draw their sustenance, retaining them in their mouths, for some weeks, until able to leave the pouch. Lastly, Viviparous animals are those, like man and most

mammals (milk-giving animals), which bring forth the young alive, and in practically the form of the adult being.

Of the Oviparous or Egg-laying class, are all birds and most insects, fishes, frogs, turtles, etc. Many insects are Ovoviviparous during the spring and summer, the eggs being hatched within the body and deposited as larvæ, but as autumn comes on the female seems instinctively to know that neither she nor the young larvæ can survive the approaching winter season, and she lays the impregnated, but undeveloped eggs, to provide for the continuance of her species next summer. The Eggs withstand the severe frost and hatch in due time in the warmth of the following spring. Of this sort is the Common Meat Fly, which usually deposits its young on Meat, in clusters, in the larval state as tiny Maggots.

Most Reptiles are of the Ovoviviparous class, the young being produced from Eggs which are hatched within the mother's body. The huge python, however, incubates its eggs, gathering them into a conical heap and coiling itself around and over them, and hatching them in two months.

The true egg of those animals which produce their young alive is the same in structure as that of the Oviparous animals, but the latter is surrounded with a much larger yolk. This greater yolk, together with the albumen or white with which it becomes surrounded, are intended as food for the developing young being. In the former case this is unnecessary, because almost immediately after impregnation the egg becomes attached to the uterus and the embryo is sustained by the mother's blood.

A description of the Egg-production of the bird may help to make this matter clear. During the laying season the bird's ovary (usually only one is active, the other being merely rudimentary) consists of a large number of eggs in a more or less undeveloped condition, and all attached by little stems to a central point through which they derive their nourishment. Some of these ova are so minute as to be scarcely visible to the naked eye, and they vary from that size to the most developed one or two, which are of the full size of the yolk. They are all traversed on the outside with minute blood vessels. This description is quite familiar to every housewife who has dressed fowls in the laying season. As the eggs one after another mature, they loosen from the ligament which binds them and pass from the

ovary into the outward passage. There they accumulate the albumen or white which surrounds them, and there the shell is formed, enclosing all. The shell and albumen, therefore, form no part of the real egg as produced in the ovary, but are merely food and protection to the embryo till it is fit to be exposed to the outside world.

A viviparous animal, then, is one whoseegg is developed into the new being only when connected with the parent's body, while an oviparous animal's egg may be developed without the body, by the application merely of external heat. Such heat may be either the heat of the mother's body, as in the case of the sitting bird, or of the sun, as in the case of the turtle and some other animals which bury their eggs in sand, which is warmed by the sun's rays, or a very small degree of heat may suffice, as in the case of the frogs and fishes, which merely lay their eggs in the shallower and, therefore, warmer parts of the water.

The truth of the second law, that "in all beings the female Eggs exist before and independent of conception," has, of course, been long known in regard to oviparous animals, such as birds, it having been frequently observed that female birds, to which a male never had access, nevertheless, laid eggs, though these eggs, of course, are sterile, and will never hatch. But in regard to the animals which develop the young within the body, the eggs are so very small that they can only be observed to be such by means of the microscope, and, of course, are very difficult to obtain, and it is comparatively lately that their existence has been proven by actual observation. It is now, however, well known that every fertile female animal produces eggs with greater or less frequency and regularity, and only in these eggs can conception take place. If they are not reached by the male semen, they pass out and are lost; but if impregnated by the semen of the male, they attach themselves to the uterus and pregnancy begins.

Even those creatures called Fissiparous and Gemiparous, are no exception to this rule. In the former the species is multiplied by the parent dividing itself into two parts, as in the case of the common earthworm, and the latter by means of buds or sprouts, as the sponge. These animals seem to be mere ovaries themselves, every part containing ova cells, and dividing itself again and again, as the rudimentary cells develop, as a hive of bees will swarm, and the new colony, growing larger, will swarm again, and so on.

The third law, that "the egg is never impregnated in the ovary which produces it," seems intended to apply only to the higher forms of life, as it is very probable that in the lower forms, such as those just mentioned, the ova are impregnated where they are produced, and the division of the creature takes place in consequence of such impregnation. In the higher forms, too, there are some occasional exceptions to the rule, as in those rare cases of ovarian pregnancy, which are sometimes met with. Yet, these exceptions are unnatural, and never produce fully-developed living young.

Even in the case of the bird, it is believed that the eggs are not impregnated until detached from the ovary. A remarkable fact in connection with the impregnation of the eggs of birds and some insects, is the extraordinary length of time the semen retains its vitality. One copulation with the male will suffice to impregnate the eggs as fast as they leave the ovary, for months the semen being retained at the ovarian entrance to the passage, and there impregnating the eggs one by one as they ripen and are cast off from the ovary. The male spider copulates but once, shedding then all his semen into the body of the female, and occupying days in the process; then, it is said, being devoured by her.

The fourth law is, that "the egg must have attained a certain degree of development before it can be impregnated." In most animals this precise degree of development is reached just when the egg leaves the ovary. Floating in the transparent fluid in the Graafian Vesicle or cell, the egg appears to derive its developing nutriment from that fluid, and when that is all consumed it is ready to be expelled from the vesicle. It is then ripe, and is not impregnated in the ovary; firstly, perhaps, because the Spermatozoa of the semen seldom penetrate so far; secondly, because they cannot penetrate the wall of the vesicle to get to the egg, and as soon as the wall is broken the egg passes out. Coste, however, thinks that impregnation usually takes place at the *Surface* of the ovary.

In many Fishes and Reptiles the eggs are not yet ready to be impregnated when they leave the ovary, but remain for a certain time longer in another organ, corresponding, perhaps, to the Fallopian Tube, till fully ripe.

The fifth law, that "the egg leaves the ovary independent of

"impregnation" is, perhaps, sufficiently considered in the discussion of the three preceding laws. In the case of Frogs, whose male deposits his semen on the eggs as they leave the body of the female, and in Fishes, in which the male merely emits his semen amongst the eggs as they float in the water, the truth of the law is obvious. And in the case of the mammalia, too, the hardest to observe on account of the smallness of the egg, the law is now thoroughly proven.

At the same time there is no doubt that, though the eggs are produced without impregnation, yet sexual excitement will often hasten the ripening of the egg, just as sexual excitement in the male increases the secretion of semen. Indeed, the egg appears to have a certain capacity for unorganized development without impregnation, and certain diseases, as chronic inflammation of the ovaries, or long-continued sexual excitement, coupled with inability of the ovary to expel the matured egg, may sometimes result in such development. Thus various fœtus-like growths have been observed in the ovaries of persons who never knew sexual intercourse, even in those of children. Hufeland mentions the case of a young girl who died at the age of thirteen years in consequence of self-abuse, practiced from her infancy, and in whose left ovary was found a sac containing hair, bones and teeth. It would appear that the parts so produced were those in which the nerve supply is least, which seems to corroborate the statement that the male seminal animalcula is alone the germ of the nervous system.

It must be said, however, that many physiologists deny the possibility of even the development above mentioned, without impregnation by the male semen, and, where such growths appear, insist that intercourse with a male of some kind has been had. And reason and analogy seem to be on their side, while the lascivious and morbid sexual passion of the Masturbating girl of even the tender age of thirteen years would leave her open to the suspicions those physiologists entertain.

The sixth, seventh and eighth laws have been sufficiently proven in preceding chapters.

The ninth law, that conception is connected with Menstruation, and there is, in human females, a period when impregnation can occur, and one when it cannot, and those periods can be pointed out, is one of considerable importance, and will come up

for discussion again in the chapter on "Limitation and Avoidance of Offspring."

As shown in earlier chapters, about the time when the Menstrual Flow ceases, an egg is always expelled from the ovary. In the ordinary course this is at once taken up by the large abdominal end of the Fallopian Tube, or probably is expressed from the ovary directly into it, as described on page 29, ante, and is put into course of transmission to the Uterus or Womb. The egg occupies from two to six days in passing from the ovary to the Womb, and usually remains a few days in the Womb before passing down into the Vagina and out. The whole time, then, from the cessation of the Menstrual Flow, when the egg leaves the ovary, till it is expelled from the Womb, is, it may be said, from two to perhaps fourteen days. During this period only can conception take place, for only when there is a ripe egg in the female organs is there any germ for the male semen to impregnate. And without the union of these two elements no conception ever takes place. Without the presence of the mature egg of the female, any semen injected is merely passed out again or absorbed into the surrounding tissues, and without the presence of the semen the egg is either broken up and destroyed, or passes out and is lost.

The tenth law, as stated by Pouchet, that in the Human being Impregnation always takes place either in the Womb or in the very end of the Tube next to the Womb, is by no means generally accepted at the present day.

The spermatozoa retain their vitality for a considerable time after leaving the male organ, if kept at the temperature of the body, and are able to continue their lively movements. They have been observed in active motion as long as three whole days after emission, and even in the testicles, where they were formed, and where they are much less vigorous, apparently, than after passing through the Seminal Vesicles and Prostate Gland, they have been seen alive twenty-four hours after death. In the human vagina they seem to lose their power of motion after twelve hours, but they probably retain their vitality much longer in the Womb and Fallopian Tubes. Spermatozoa have been found in full vigor in the genital organs of bitches and rabbits seven or eight days after intercourse with the male, and there seems no reason why the spermatozoa of the human being should be less tenacious of life, though

Hollick believes they will live no longer than about twenty six hours after ejaculation. These minute beings, then, seem to have sufficient length of days and sufficient power of locomotion to take them to any part of the genital organs, from which they are not absolutely barred, but there is a wide difference of opinion as to the part of the genital tract in which they and the ovum actually meet, and where impregnation, therefore, occurs. Hollick contended, in 1860, that it is impossible for the Spermatozoa to ascend the Fallopian Tube, because the cilia in the Tube slant toward the Womb. But it would seem that they are so exceedingly minute (about one six thousandth of an inch in breadth), that, in spite of the cilia which would form an obstruction to the passage of a much larger being, to the Spermatozoa, the hair-like channel of the Fallopian Tube is to them a broad, open road.

In animals, killed shortly after copulation, Spermatozoa have been seen in all parts of the female genital organs, even on the surface of the ovary, but especially in the Fallopian Tubes. The fact that sometimes even ovarian *pregnancy* occurs, the fœtus being developed within the substance of the ovary, shows that in the human female the spermatozoa do penetrate so far. There is little doubt that in such a case the spermatozoon has not penetrated the covering of the Graafian Vesicle, but the vesicle has burst in due course, and the ovum, instead of passing out, has in some way become attached to the cell wall, and was there impregnated. Numerous cases have been reported of Abdominal pregnancy, where the egg either failed to be taken up by the Fallopian Tube, or, being taken up, was spilled out again into the cavity of the abdomen, was there impregnated, and there the fœtus developed. These, of course, are unnatural sites for pregnancy, and it seems probable that the spermatozoon usually meets the ovum in the large part of the Fallopian Tube, next the ovary, very shortly after the egg escapes from its containing vesicle or cell. Coste declares, indeed, that unless the ovum is impregnated soon after its expulsion from the ovary it degenerates rapidly by changes in its structure, and, further, that it soon becomes coated in the Fallopian Tube with a layer of albumen, which the spermatozoa cannot penetrate. He believes, therefore, that impregnation can only occur either on the surface of the ovary or just within the fimbriated ovarian extremity of the Tube.

The precise manner in which impregnation takes place was

very long in controversy, and so very minute are the objects to be observed, and so delicate the processes, and so difficult to obtain specimens from the higher beings, and especially man, that, even with the aid of the most powerful microscopes, observers are, so far, obliged to leave some points in doubt, and differ among themselves.

Even the fact that fertilization or impregnation is due to the union of two essential principles, a male and a female, though suggested by Alcmæon (580 B. C.), did not receive universal acceptance until last century. And then attention was (in 1761) called anew to the question by the results of experiments in plant hybridization of plants, which is done by depositing the male pollen, or flower dust (corresponding to the semen of animals) upon the pistils, or female organs of another plant. The resultant of this fertilization is the production of seed in the plant so fertilized, of a mixed character, resembling both that of the plant on which it grows, and that of the plant from which the pollen was taken. The mixing of different varieties of Indian corn and various other plants is well known to farmers and gardeners. Where varieties of corn are planted in the same, or in adjoining fields, the wind carries the pollen, the fine dust from the tassels, of one or both, and it lodges on the pistils (commonly called the silk) projecting from the green husk of the other. The pollen immediately takes root and sends a tiny rootlet down the long body of the "silk" to the germ of the grain at its base, and impregnates it, conveying something of its own variety to the offspring grain. Some varieties of Strawberries, such as the Bubah, are female only, and, if planted alone, will bear no fruit, their flowers remaining unfertilized. Other varieties, such as the Wilson, are hermaphrodite or bi-sexual, having both the male and female organs in their blossoms. Gardeners are well aware, then, that to get fruit of the Bubah, or other merely female-flowered variety, they must bring flowers of the other sex into proximity to it. Accordingly, they plant the Wilson, or some other male-flowered plant, near or in alternate rows with it, and by means of the winds and of insects travelling from flower to flower, the pollen is carried to fertilize the pistils of the female flower.

Experiments were then begun on animal life, first with Trout and Salmon, the eggs of which were artificially fertilized by Jacobi, and afterwards with Frogs, Tortoises and Dogs, by Spall-

anzani, in 1780. Spallanzani thought that it was the fluid of the semen which fertilized the eggs, and it was not till 1824 that it was shown that the presence of the spermatozoa was necessary to impregnation. This was proven by filtering the semen to remove the spermatozoa, and the resultant clear fluid proved, on experiment, to be quite ineffectual. In 1843 Barry, experimenting with the ovum of a rabbit, observed some of the Spermatozoa in its outer layer; Nelson, in 1852, observed the actual entrance of spermatozoa into the ovum of Ascaris; and in 1853 Keber discovered the Micropyle, that is a minute aperture in the coating of the yolk of the egg, in the egg of the Mussel, and saw a Spermatozoon pass through it into the yolk.

For many years after this stage of knowledge was reached, it was generally believed by physiologists, and commonly taught in the Medical Colleges, that the Spermatozoon, on getting into the yolk of the egg, dissolved or broke up into infinitesimal fragments, and was dispersed throughout the yolk, imparting some mysterious principle of life to it. And this heresy may be found in some books in use to this day, though Hollick, as early as 1860, demonstrated the contrary. Hollick, on the other hand, quite as erroneously, supposed the female pro-nucleus, the Germinal Vesicle, to pass out and disappear, as having no other function than to open a way for the Spermatozoon, or Seminal Animalcula, of the male to enter, which then became merely a seed planted in the good ground of the yolk, and began so to grow and develop.

PLATE XI.

VAN BENEDEN'S ILLUSTRATION OF THE SUCCESSIVE STAGES OF IMPREGNATION OF THE OVUM, OR EGG.

A, Spermatozoa in Mucilaginous coat of ovum of Asterias Glaciales, a prominence rising from surface of ovum towards a Spermatozoon. In B they have all but met, and in C they have met. D, Spermatozoon enters ovary through distinct opening. H, Ovum, showing polar vesicles and approach of male and female pronuclei. E, F, and G, later stages in the coalescence of the two nuclei.

Oscar Hertwig, in 1875, pointed out that fertilization depended on the union in the egg of two nuclei, or germs, of different sexes, but it remained for Van Beneden, in 1876, to point out clearly the manner in which the very last act in impregnation took place. Plate XI. shows the various stages of this impregnation of the ovum of the Ascaris, and Van Beneden's experiments with Rabbits show that the plan is essentially the same in their case.

Briefly, then, the method of Impregnation may be summarized, as follows: The ripened egg leaves the Graafian Vesicle, or Cell, of the Ovary, is taken up by the Fallopian Tube, and starts on its way down that tube towards the Womb. The Male Semen is cast by the Male Penis, or artificially, into the Vagina, or even into the Womb. The Spermatozoa, or living germs, in the semen, having the power of locomotion, proceed up the cavity of the Womb, or even farther, and up the Fallopian Tube, in search of the egg. Wherever they meet the ripened egg they seek an entrance into its interior. One (sometimes but not usually more than one) finds entrance through an aperture, called the Micropyle, which aperture either was there from the beginning, through which the egg should receive its nutriment while still in the Ovary, or which was rent in the covering of the egg by a portion of the Germinal Vesicle, called the Polar Globule, passing out there. The Spermatozoon passes through this opening, it approaches the female pro-nucleus, it coalesces and blends with the female pro-nucleus, and impregnation is complete.

After impregnation, the egg, if not already in the Womb, usually and properly passes down the Fallopian Tube and lodges in the Womb, where it becomes attached, and remains to complete its development.

The further development of the impregnated ovum will be described in the next chapter.

CHAPTER XII.

DEVELOPMENT OF THE NEW BEING.

First Changes. When the Spermatozoon enters the egg it seems to lose its long tail, which was merely a bit of protoplasmic jelly, and only useful for driving the body along, and becomes known as the Male Pro-nucleus. This presently unites with the developed remnant of the Germinal Vesicle, known as the Female Pro-nucleus. They lose themselves in each other's embraces, and constitute a bright, clear speck in the centre of the yelk, called the Vitelline Nucleus. From this certain V-shaped loops project, both from the male and female halves. Now begins the process of development, and this proceeds at first, and probably throughout, in what, to the layman, appears to be a very remarkable method. It is called Segmentation. The whole yolk, including the Nucleus, divides itself into two parts, and each half of the nucleus takes its position in the centre of the cell, formed of its half of the yolk. Each of these halves again sub-divides, and the cells so made again sub-divide, until the whole yolk is divided into innumerable little cells, or globules of the yolk, each containing in its centre a portion of the nucleus.

Then the outer layer of cells, next to the Zona Pellucida, or containing Membrane of the yolk, unite together at their edges and form a new layer, or membrane, within the outer one. This new layer is called the Blastodermic Layer. This layer soon divides into two, and a third is formed between them. From these three layers, or hollow spheres, the entire fœtus is formed.

During the time these changes are going on, the egg is progressing down the Fallopian Tube towards the Womb, and the womb is preparing to receive it. The mucous membrane which lines it becomes thicker and full of blood, so that it almost or quite fills the cavity of the Uterus, just as occurs during menstruation, but in a greater degree. The extra thickness forms in effect a distinct membrane, which affords a good resting ground for the impregnated egg until its connection with the uterus shall be more fully developed. This membrane, which is called the Decidua, becomes, of course, greatly enlarged and altered during pregnancy, and after delivery is all, or nearly all, cast off.

The progress of the egg towards this prepared place is caused partly by the action of the cilia, or hair-like process, growing on the inside of the Tube. These slant towards the Uterus, and, as they keep shortening and lengthening themselves constantly, they gradually push the ovum along the tube. Also, there is a certain peristaltic action in the Tube, one wave of muscular contraction after another passing from the ovarian end to the Uterine end, and gradually crowding the egg towards its lodging place in the Womb. When the ovum reaches the womb it soon becomes imbedded in the folds of the thickened mucous membrane above described, called the Decidua. Usually it remains at some point near the Fallopian Tube from which it came out, the swollen folds of the membrane preventing it from going further down. Sometimes, however, particularly in women who have borne many children, in whom the hollow of the womb is enlarged, it descends lower towards the *os utcri*, or Mouth of the Womb, or across into the opposite angle, near the other Fallopian Tube.

According to Coste, the mucous membrane now begins to sprout out around the base of the ovum, and gradually grows out until it quite envelops the ovum and covers it in. This new membrane so formed is called the Decidua Reflexa, or bent-back Decidua, while the other which lines the Womb, and from which this sprung, is called the Decidua Vera, or True Decidua.

Until the third month of pregnancy these two membranes are not in close contact, and there may even be considerable space between them. Indeed, in some cases one Fallopian Tube has its Uterine End quite free from obstruction, so that, where the ovary on that side proceeds to ripen an egg during pregnancy, as is sometimes the case, and sexual intercourse is had, the spermatozoa may find their way up and impregnate the egg. The egg passes down and lodges in the Womb, as did the first, and a second pregnancy begins some weeks, or even months, after the first. This is called Superfœtation. This is particularly liable to happen where the Womb is Bifid, that is, divided into two parts by a partition extending part way from the Fundus towards the Mouth of the Womb. This, however, will be discussed in the chapter on Superfœtation.

As stated, until the third month the two membranes, namely, that which lines the womb and that which grew out from it and surrounded the ovum, are not in close contact, but gradually by

the growth of the ovum they are pressed closer together, till eventually they blend into one membrane, and cannot be separated. This forms the outermost envelope of the fœtus.

The Primitive Trace. Returning now to the development going on within the impregnated ovum, we observe that after or during the formation of the three layers within the enveloping membrane of the egg, one oval portion of the layers is observed to be considerably thicker than the rest. This is called the Area Germinativa, or germinative area, and in the centre of this oval portion may be seen a narrow, straight line. This line is called the *primitive trace*, and is the very youngest visible form of the human being.

On each side of this *primitive trace* two ridges spring up, which grow around and join at the back behind this line, and also join in front, thus enclosing the new being. The embryo so formed now curves by lifting the two ends from the covering of the egg, against which it had been resting, the back, where later the backbone is to be formed, being the outer side of the curve. At the same time one end, which later proves to be the head, becomes considerably larger than the other.

We do not think it necessary, in a work of this character, to follow in minute detail all the changes which progressively take place in the embryo, but shall state them in a general manner.

The Amnion and Liquor Amnii. Very soon after the formation of the embryo a sheath forms around it next outside the skin, called the Amnion. It consists of two layers, the outer layer becoming known as the sub-zonal membrane. The space between these two layers soon becomes filled in with a fluid called the *liquor amnii*, in which the fœtus, enveloped in the Amnion membrane, floats. This fluid becomes more and more abundant as the fœtus increases in size, and separates the fœtus from the womb by this fluid cushion, enabling it to move easily and to develop freely, and protecting it from injury from shocks and jars while in the extremely tender and delicate condition of the early months, and also from unequal pressure by the Uterus. Also it assists in distending the uterus evenly and smoothly, and protects it from the injury which otherwise the movements of the fœtus might cause.

During the earlier months of pregnancy this fluid is of greater weight and bulk than the fœtus, which rests in it; but, as time goes on, the fœtus increases faster than the fluid, till at the time

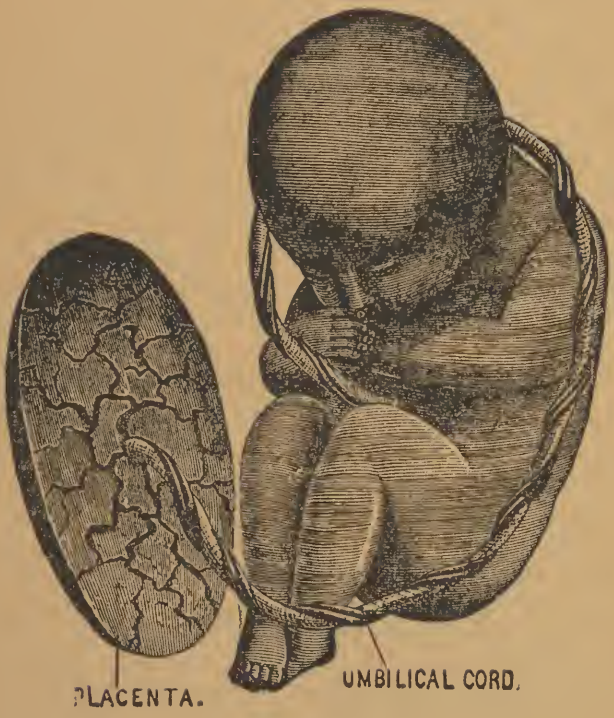
of delivery it weighs four or five times as much as the liquor which surrounds it.

About the middle of the curved or front side of the fœtus is a tube connecting with the larger cavity or sac, which contains the rest of the yolk, and which sac is called the Umbilical Vesicle. This tube connects with the fœtus at the navel, and through it the fœtus uses the yolk as food, until its connection of blood-vessels with the mother becomes perfect.

How Connection Formed. From the navel, also, or rather from the point where the navel is afterwards found, there sprouts off, about the twentieth day after conception, a certain organ called the Allantois. This is well supplied with blood-vessels. It grows rapidly, until it spreads itself over the whole interior surface of the membrane, which now encloses the ovum. This membrane, called the *Chorion*, is formed of the outermost of the Blastodermic layers, described near the beginning of this chapter. The Allantois everywhere unites with the Chorion. The Chorion sends out a great number of rootlets over the whole outside of the ovum, and these strike into the Decidua Reflexa, that sheath which sprang up out of the lining of the womb and enveloped the ovum, and cause it to grow fast, and blood is furnished to the fœtus thus through the Decidua, Chorion and Allantois. It so continues for some time, but as pregnancy advances the rootlets shrivel up, except at the spot where the egg rested against the lining of the womb at first. There, instead of dwindling away, they increase greatly in size and develop into the organ, by which, in the later months, the fœtus is nourished—the *Placenta*.

The Placenta. This organ varies greatly in different animals. In the Sow and Mare, and in the Cetacea (whale, Porpoise, etc.), it covers the whole interior surface of the Uterus. In the Ruminants, or cud-chewing animals (Cow, Sheep, etc.), it is divided into a number of small, separate masses, scattered here and there over the inner surface of the womb, which the stock-breeders call the "buttons." In the Carnivora, as the Dog, Cat, Wolf, etc., and in the Elephant, it forms a strip or belt around the interior of the womb. But in the Human race, and in some others, the placenta is in the form of a circular mass. In the Human being it is usually from six to eight inches in diameter, and three-fourths of an inch to an inch and a half in thickness, and weighs from eighteen to twenty-four ounces, though it has

PLATE XII.



been known, in some abnormal cases, to weigh several pounds. Sometimes, also, it exists in several separate parts. All over the surface of the placenta next the womb, it is attached to the Decidua, or lining membrane of the womb, before described, and all over its surface next the fœtus, it is attached to the Chorion, the outermost of the true fœtal membranes, except where the Umbilical cord enters the Placenta. The Placenta is the feeding and breathing spot of the fœtus. It consists of two portions, the Fœtal and the Maternal. The fœtal portion contains the tiny rootlets, before described, as pushed out by the Chorion. The Maternal portion consists of one or more large vessels, filled with the pure oxygenated arterial blood, fresh from its airing and purification in the lungs of the mother. Into this reservoir of pure oxygenated blood the tiny rootlets, or villi, penetrate, as the roots of a willow tree run into the water of a well. Each rootlet contains an artery, carrying the blood towards the extremity, a vein carrying it back again, and minute blood-vessels, called capillaries, connecting the outer end of the artery with that of the vein. The walls of these capillaries are so extremely thin that the constituent elements of the blood are able to pass through them. Those arteries and veins are connected with the circulatory system of the fœtus by arteries and a vein, which pass along the umbilical cord, connecting the fœtus with the placenta.

Through these umbilical arteries the heart of the fœtus pumps the venous, or vitiated blood, to the placenta, just as after birth it sends it to the lungs for purification. In the placenta the blood passes down through all those little rootlet arteries, through the capillaries, into the veins, and back again to the fœtus. But while passing through the capillaries in the rootlets, which are immersed in the pure arterial blood of the mother, the fœtal blood absorbs, through the capillary walls, the oxygen from the maternal blood to purify it, and nutriment to nourish the fœtus. The blood then passes back to the fœtus purified and enriched.

When the time approaches for the expulsion of the fœtus by childbirth, those tiny rootlets, or villi, by which the fœtal membranes are attached, begin to undergo a fatty degeneration, as does also the Decidual layer between the placenta and the uterus. If this degeneration go too far before the expulsion of the fœtus, there may not be enough rootlets left to carry nourishment and purification to the fœtus, and it may die. This sometimes hap-

pens, and such degeneration is responsible for a certain proportion of still-births.

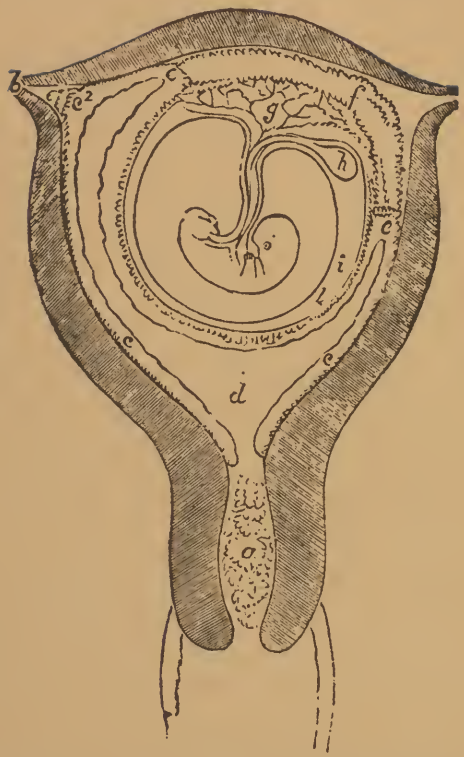
The Umbilical Cord is the channel of communication between the fœtus and the placenta. It is attached to the fœtus at the Umbilicus, or navel, and to the placenta usually near its middle, though sometimes at its edge. Its average length is from eighteen to twenty-four inches, though it is sometimes found as long as fifty or sixty inches, and as short even as five or six inches. When fully formed, it consists of its enveloping membrane, two umbllical arteries, one umbilical vein, and a quantity of transparent gelatinous substance surrounding the blood-vessels, and contained in a net-work of fibres. The vessels of the Cord, which are straight at first, usually become afterwards very much twisted, the arteries, which appear to be longer, being external to the vein. In nine cases out of ten the twist is from left to right. This twisting is probably due to the movements of the fœtus. Sometimes, indeed, a common knot is even found in the cord, the fœtus having passed through a loop in the cord, probably in its early stage when very small; but these knots do not appear to affect the circulation at all. Sometimes they are only formed during labor at childbirth.

The Fœtus in Its Successive Stages. In the *first month* of pregnancy the fœtus is a minute jelly-like, half-transparent mass, of a grayish color, and of no definite structure. It is only about one-twelfth of an inch in length, and in case of abortion at this period it is rarely found, being lost in the blood clots. It is, however, already surrounded by the Amnion, which forms the lining of its water-bed.

Second Month. This embryo is now about half an inch in length, and curved on itself, as described earlier in this chapter. It weighs about sixty-two grains. The head and extremities appear. The eyes are visible as small black spots. The spinal column appears as separate vertebræ. There appear two large glandular structures, called the Wolffian Bodies, which contain the rudiments of the Generative and Urinary Organs. The independent circulation of the blood of the fœtus is beginning.

Third Month. The Embryo at this time is two and a half to three and a half inches in length, and weighs from seventy to three hundred grains, say one twenty-fifth of an ounce. The forearm is well formed, and the first traces of the fingers are visible. The placenta, by this time, is distinctly formed.

PLATE XIII.



SECTIONAL PLAN OF THE GRAVID UTERUS (FROM WAGNER) IN THE THIRD AND FOURTH MONTHS.

a, Plug of Mucous in Neck of Uterus. *b*, Fallopian Tube. *c*, Decidua Vera. *c 2*, The Decidua Vera passing into the right Fallopian Tube; the Cavity of the Uterus is almost completely occupied by the ovum. *e*, *e*, Points of the reflection of the decidua reflexa (in nature the united deciduae do not stop here, but pass over the whole uterine surface of the placenta). *g*, Supposed Allantois. *h*, Umbilical Vesicle. *i*, Amnion. *k*, Chorion, covered with the decidua reflexa. *d*, Cavity of the decidua. *f*, Decidua serotina, or placental decidua.

Fourth Month. By this time the fœtus is about six inches long, and weighs from four to six ounces. Out of the Wolffian Body the genital organs have developed, and the sex can be ascertained on examination, post mortem, of course. Many of the bones are well under way of formation. The eyes are prominent.

Fifth Month. At the end of the Fifth month the length is nine or ten inches, and the weight about ten ounces. The head, in which the convolutions of the brain are formed, is about one-third the entire length of the fœtus, and is covered with hair. The nails are beginning to form. The ischium, or back part of the pelvic bones, is beginning to ossify or become bony.

Sixth Month. Length, eleven to twelve and a half inches; weight, about one pound. Hair darker, eyelids closed, eyelashes formed. Some fat deposited under the skin. The testicles of the male have not yet descended into the scrotum. In the female the Clitoris is prominent. The pubic, or front bones of the pelvis, have begun to harden.

Seventh Month. The fœtus is now growing and developing very rapidly, being thirteen to fifteen inches in length, and weighing three or four pounds. The eyelids are open. The Skin is covered with the sort of ointment which is on it at birth. The testicles of the male have descended into the scrotum.

Eighth Month. Length, sixteen to eighteen inches; weight, four to five pounds. The size or thickness increasing faster than the length. Nails completely developed.

Ninth Month. At the end of nine months, forty weeks, or two hundred and eighty days, the fœtus is at "full term," and ready to be born. The average weight of a child at birth is six and a half pounds, and it measures, on the average, twenty inches in length. There may be, however, a wide variation from these figures, but of three thousand children born under the attendance of Dr. Cazeaux, only one weighed so much as ten pounds. Ramsbotham, however, mentions a fœtus which weighed sixteen and a half pounds, and Cazeaux tells of one which he delivered weighing eighteen pounds, and measuring twenty-five and a half inches in length. The British Medical Journal, for February 1, 1879, records the birth of one weighing twenty-one pounds. Probably the "record" is held by Mrs. (Captain) Bates, wife of the museum giant, who was seven feet seven inches in height. This Nova Scotia woman, herself a giantess of seven feet nine inches stature,

produced a fœtus, their second child, thirty inches in length and weighing twenty-three and three-quarter pounds. The child died in birth, as it was impossible to deliver it without forceps, and none could be obtained large enough to grasp its head. Their first child weighed nineteen pounds at birth. The very large children are more frequently still-born than those of more moderate size, sometimes losing their lives in delivery, and sometimes, having failed to be expelled at term, they have suffocated in the womb.

On the other hand, children as small as *one pound* in weight have been born at full term and lived.

The average size of the male child at birth is somewhat greater than that of the female, the weight averaging about ten ounces more and the length about a half inch greater.

The hair with which a child is born is frequently quite long, and may be fairly considered to be of the color the hair will be in adult years. But this first hair generally falls out gradually during the first few months, and is replaced by new, of a much lighter color. Sometimes it does not fall out, but changes its color.

The eyes of the newborn babe are always of a dark, steel-gray color, and gradually change to the color they will have in adult years.

The heads of male children are larger and more firmly ossified than in female children. The result is a greater difficulty in delivery of male children, with a correspondingly greater death rate both in them and in the mothers. Sir James Simpson calculated that between the years 1834 and 1837, there died in childbirth in Great Britain, as a consequence of the slightly larger size of the head of the male fœtus than that of the female, from forty-six thousand to forty-seven thousand male infants, and from three thousand to four thousand mothers.

The shape and diameter of the child's skull are very considerably altered during labor, so as to pass it more easily through the ring of the pelvic bones. The skull is in several pieces, joined by a sort of seam-like union, called *Sutures*. Between the edges of the bones, spreading over the spaces between them, are membranes, called *Fontanelles*. That in the front part of the skull, a little back of the hair line, is a quite large triangular space. During childbirth these sutures and fontanelles allow the edges of the skull to squeeze together, and even overlap, quite altering the

shape of the head, and facilitating its passage out. A very considerable alteration may thus be made without injury to the fœtus, and a new-born child may often be seen with the shape of its head quite altered. The head soon regains its normal shape, however, and gradually the *Sutures* close up and become firm, while the *Fontanelles* ossify and become hard bone like the rest.

CHAPTER XIII.

CHANGES IN THE MOTHER DURING PREGNANCY.

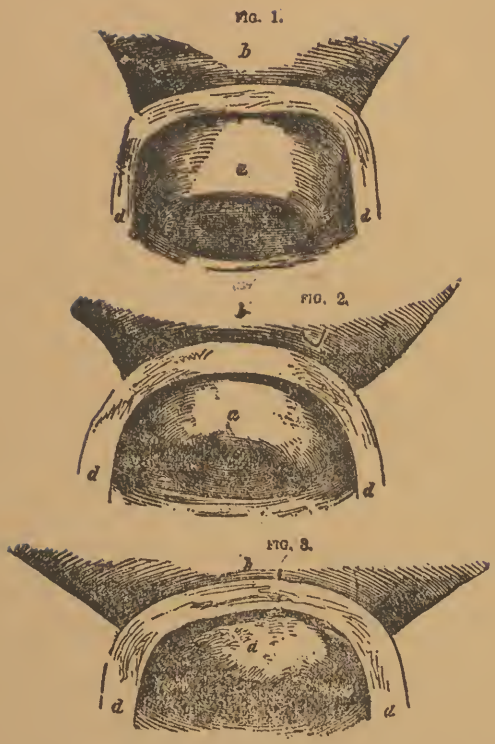
AS soon as conception has taken place, the uterus and several other organs undergo remarkable changes.

Changes in the Uterus. The Uterus in its ordinary state is about two and a half inches long, one and a half inches wide from side to side at it widest part, and one inch thick from front to rear. But during pregnancy it increases to a diameter of twelve inches, or even more, and to a weight of one and a half pounds, or upwards. This growth continues during the whole period of pregnancy. During the first three months, or thereabouts, the Uterus is contained within the cavity of the Pelvis, but after that it becomes too large for such narrow quarters, and rises above its brim Then for the first time the increase in size of the abdomen is apparent to an outward observer. Indeed, until then the abdomen is frequently even somewhat flatter than usual, owing to the descent of the uterus, by its increased weight, within the pelvic bones.

About the time the Uterus rises above the Pelvis, say about the middle of the third, or beginning of the fourth month, the mother usually begins to feel the movements of the fœtus in the womb, commonly termed the "quickening." Towards the end of the fourth month the Uterus reaches about an inch and a half above the top of the pubic bone, and about the sixth month it is on a level with, or a little above, the navel. About the seventh month the navel begins to be prominent, projecting more or less, and the Uterus extends about two inches above it. By the ninth month the *middle* of the Uterus is about at what was the waist line.

For about a week or so before delivery the parts below the womb begin to relax and soften, preparatory to delivery, and this allows the womb to descend a little from its highest position. The result often is that the viscera, above the womb, are considerably relieved of pressure, and the woman feels much more comfortable; so much so, indeed, that she sometimes undertakes work which she should not do, or goes upon journeys when she would be safer at home. The writer has known cases in which a

PLATE XIV.



THE WOMB AT THE THIRD, SEVENTH AND NINTH MONTHS.

Fig. 1. Form and size of the Neck of the Womb at the third month. Fig. 2, at about the seventh month. Fig. 3, at the ninth month.

The references are the same in all. *a*, The Neck of the Womb; *b*, The Body of the Womb; the dark spot in the centre at the bottom of the neck is the Os Uteri, or Mouth of the Womb; *d d*, The cut edges of the Vagina.

prospective mother has felt quite able to walk down the street, even going shopping, and feeling in fine health and spirits, but has been taken with labor pains in the store or on the street, and with difficulty removed home.

Usually, on account of the projection of the spinal column inwardly, the Gravid Womb does not lie in the middle, but a little to one side. Sometimes, indeed, it is quite to one side, in the flank, so to speak. This lateral displacement is, in a large proportion of cases, to the right side. An opinion popularly held in some districts that where the pregnant uterus appears to lie rather to the right of the centre line the child will prove to be a boy, and if to the left, then a girl, has no foundation.

During the first two or three months the *os uteri*, or mouth of the Womb, is lower down than usual, and can readily be felt by the finger introduced into the Vagina, but after the Uterus rises out of the pelvic cavity the Mouth of the Womb is often so high up as to be quite out of reach.

In the ordinary condition the bladder is interposed between the Uterus and the front or wall of the abdomen, but in the latter stages of pregnancy it comes directly against the abdominal wall, resting on it and on the inner side of the pubic bone.

During pregnancy the womb, which before was firm, solid, and comparatively inelastic, becomes full of blood, soft and yielding to pressure. Throughout the whole term it is not stretched and thinned by the pressure of the ovum from within, but grows to accommodate its tenant, and its walls remain during the whole period about the same thickness.

All these changes take place in the *fundus* and *body* of the womb, the cervix, or neck, remain of its usual size, and even the cervical cavity not being merged in the distended cavity above it, nor at all altered in size. It was formerly supposed and taught that the cervix was gradually shortened, being taken up by the increasing womb, until eventually it becomes quite obliterated, but this is now generally conceded to be an error. The apparent shortening is due to the deception caused to the touch by the tissue of the cervix becoming very soft and lax, and affording little or no resistance to the finger. The *os uteri*, however, usually becomes somewhat open and expanded during the last two or three months of pregnancy, especially in women who have borne several children.

Changes in the Blood. Usually the composition of the blood changes a good deal during pregnancy. It becomes more watery, and the serum, or watery part of it, is deficient in albumen. The red blood-corpuscles diminish greatly in number, as they do in the case of ænemia, averaging 111.8, as against 127.2 in the ordinary state. Speaking generally, the blood becomes impoverished, probably because of the nutriment taken out of it in the placenta, as described in the last chapter, and very nourishing and easily-digested food is required. Also, the pregnant woman should pass a good deal of time in the open air, or, at least, see to it that the air she breathes is pure, as she has, by her lungs, to oxygenate the blood for both herself and the child in her womb.

Changes in the Heart. During pregnancy the heart becomes from one-fifth to one-sixth larger than in its ordinary condition. This enlargement is confined to one part, the left ventricle, being that part which forces the blood throughout the general circulatory system. If the mother do not suckle the child the heart diminishes in size again immedialely after delivery, but in women who have borne many children the heart remains permanently larger than in those in who have borne none.

Changes in the Urine. A certain substance appears in the composition of the urine, which, though sometimes found in that of non-pregnant women and even of men, it is almost never absent in that of pregnant women. It is a peculiar deposit, formed when the urine has been allowed to stand for some time, called *kiestein.* It seems to have been observed even in ancient times. If the urine be allowed to stand for a period varying from two to seven days in a cylindrical vessel, exposed to light and air, but protected from dust, a peculiar substance, in appearance like fine cotton wool, appears in the centre of it. Soon after it rises to the surface and forms a thin, hard-looking scum, which in a few days breaks up and sinks to the bottom. An examination under the microscope shows it to be composed of fat particles, various phosphates, and a large quantity of a certain thread-like bacteria, or minute living organisms, called vibriones. This characteristic of the urine usually makes its appearance early in the third month of pregnancy, and continues until the seventh or eighth month.

PLATE XV.

Fig. 1.

Fig. 2.

Fig. 1. Test of pregnancy, by Ballottment. Mode of applying this test. The index finger of the right hand is passed into the vagina until it touches the body of the womb. The left hand is pressed firmly against the abdomen, just above the pubic bone. The womb is then pressed tightly and suddenly with the finger of the right hand, so as to throw the foetus (if any, which is floating in the amniotic fluid, against the opposite side of the womb. It rebounds and returns, giving a distinct tap against the finger, which may be readily felt, and is quite unmistakable.

This plate gives a very good representation of the development of the womb and change of position of the organs about the third month.

Fig. 2. Appearance of the breast in pregnancy. *a a*, The prominence of the breast. *b*, The Nipple. *d d*, The Aureola. The little spots on it are the tubercles mentioned in the text.

CHAPTER XIV.

SIGNS AND SYMPTOMS OF PREGNANCY.

THE question whether or not pregnancy exists is often one of very great importance, involving in many cases, not merely the gratification of a proper curiosity, but the reputation and even the life of the woman.

By the old English law, which also is still in force, if a woman condemned to death were discovered to be pregnant, the execution was postponed until her delivery. The fact was ascertained, or attempted so to be, by empanelling a jury of matrons, who made an examination of the woman, and gave their verdict. Also where the person in whom pregnancy is suspected is unmarried, of course her reputation for chastity frequently hangs upon the judgment of the medical man who is consulted regarding her symptoms.

Yet it is frequently very difficult to ascertain and state positively whether pregnancy actually exists or not. For if the woman be anxious to conceal the fact, or if she be hopefully awaiting such a condition, in either case her statements have to be taken with a certain degree of reserve.

Sensations During Intercourse. Some women profess to experience an unusual sensation during a *fruitful* intercourse which they do not at other coitions. Some medical writers, too, are inclined to attach some importance to this. The supposed existence of such sensations cannot, however, be generally relied on as a sign of conception. It is tr. e that an unusually strong ejaculation of semen, such as would throw it up into the fundus of the womb, would be much more likely to produce conception than one less forcible, or when the semen was merely spilled into the vagina. And such vigorous injection of a quantity of semen, amounting probably to a desert spoonful or more, would probably be sufficient to fill the cavity of the womb, and to cause even the sense of pressure on its walls. Those women who are able to distinguish a fruitful copulation are probably those who conceive only when the semen is so thrown completely into the womb.

Cessation of Menstruation. The first noticed and most universally present sign of pregnancy is the cessation of the monthly flow, and this forms the only reliable guide whereby the probable time of delivery may be calculated. Where the courses have previously been regular, and there appears no other cause likely to have caused the suppression, the failure of the flow to appear at or about the usual time may usually be taken as affording a strong presumption of pregnancy, but it can never be taken as certain, unless there are other signs, for various other causes may lead to the suppression of the menses. Excessive mental labor, strong emotion, the debility arising from incipient phthisis, exposure to cold, as by sitting on the seat of an open and exposed privy closet in winter, the nervous disorder arising from the experiences of the early marriage days, and various other causes, may produce this suppression. Sometimes a married woman the strong desire to find herself pregnant, or in unmarried women who have subjected themselves to the rest of pregnancy, mental emotion and alarm frequently produce the same result.

The uncertainty of this as a sign of pregnancy is increased by the fact that in many cases the monthly flow occurs, or apparently occurs, once or twice, as usual, though pregnancy has taken place, and cases have been known in which menstruation continued regularly throughout the whole period of pregnancy. The latter case is extremely rare, but the former is by no means unusual. As before explained, while the impregnated egg comes down one Fallopian Tube and lodges in the womb, the other ovary may, and sometimes does, continue its functions. And for a time, there being a space between the *Decidua Vera*, which lines the womb, and the *Decidua Reflexa*, which envelopes the impregnated ovum, the menstrual flow may rise in and flow from that part of the womb as yet unoccupied by the ovum. By the third month, however, the space of the womb is usually pretty well filled by the growing ovum, and after that true menstruation rarely occurs. Often cases of supposed menstruation at later periods are only loss of blood, from the bursting of a small vein, abrasion of the mouth of the womb, ulceration, or the breaking of a small tumor. Regular menstruation after the fourth month is, however, so rare that if it take place we are justified in believing that no pregnancy exists. Also, in the case of an unmarried woman, if she be aware that cessation of the menses is

looked upon as a sign of pregnancy, she is very apt to allege that she is perfectly regular, and cases have been known in which she counterfeited menstruation by staining her linen artificially for the purpose of diverting suspicion.

Also conception sometimes takes place during lactation (nursing) when menstruation is not occurring, so that no suppression appears to mark the beginning of pregnancy; even young girls, in whom menstruation has not been noticed to have begun, conception sometimes takes place. In either of these cases, of course, there is no cessation to mark the beginning of pregnancy.

Considering all these facts, we may fairly consider the cessation of menstruation as affording a fair presumption of pregnancy, where there appears no other clear reason for such cessation.

Morning Sickness. Various sympathetic disturbances of the system usually make their appearance shortly after conception, and none of these is more noticeable, or, indeed, more characteristic, than that popularly known as "morning sickness." This is a nausea, or vomiting, generally felt on arising. Sometimes it begins as soon as conception has taken place, but usually not till the second month. It does not often continue longer than till the fourth month, though sometimes it lasts almost throughout pregnancy. In some cases, too, it is not confined to the hours after rising, but lasts more or less throughout the day, though generally it passes away in a few hours, leaving the woman feeling quite well the rest of the day. In some cases there is only nausea and disinclination to eat breakfast; in others there is retching and vomiting, bringing up the food if any be taken, or merely some glary fluid. Sometimes, indeed, this sickness is so severe and persistent as to seriously affect the health of the patient, threaten her with starvation, and even endanger her life.

The cause of this "Morning Sickness" is not certainly known. Dr. W. S. Playfair believes that it arises from the sympathetic disturbance caused by the stretching of the nerves of the womb by the growing ovum, but this seems hardly consistent with the now generally accepted opinion, which Dr. Playfair himself holds, that the ovum does not stretch the womb, either by mechanical pressure or otherwise, but that the womb *grows* to accommodate the ovum. Dr. Henry Bennett believes that, at any rate when at all severe, it is always associated with and probably caused by

congestion and inflammation of the Neck of the Womb. Dr. Graily Hewitt holds that it arises entirely from the irritation of the nerves of the womb, caused by the flexion (bending) of the womb out of its usual position. Regarding these last two theories, it may be said that neither congestion nor flexion are at all usual, but the occurrence of the morning sickness is almost invariable, so that in most cases, at any rate, it cannot arise from either of those causes. Another theory, and to me it seems probable that it is the correct one, is that it is caused by the tension of the nerves of the supporting ligaments of the womb and ovaries (and the sinking of the other abdominal viscera), as their greater weight causes them to descend, the womb sinking into the pelvis. It is about the second month when the weight of the womb has increased sufficiently to cause it to so sink and stretch the nerves, and allow the other abdominal viscera to sink slightly with it, and then the morning sickness begins. While the woman is lying down this sickness is not felt, because the organs then return to their normal place, and the tension is relaxed. About the fourth month the uterus begins to rise out of the pelvis, and within a short time this morning sickness disappears, only to be succeeded, in the later months, by a sense of pressure, sometimes almost of suffocation, as the greatly enlarged womb presses upward on the other organs.

It is a common saying that a "sick" pregnancy is a safe pregnancy, and there is probably a good deal of truth in it, for it is generally observed that in those women in whom the "morning sickness" is absent, there is a much greater tendency to syncope, or fainting fits, and even to miscarriage.

Various other phenomena frequently attend pregnancy, such as disorders of the digestive organs, depraved appetites and unnatural cravings, constipation, diarrhœa, flatulence, partial or complete fainting spells, tooth-ache, with even caries or decay of the teeth, etc.

The extraordinary "longings" of some pregnant women are amusingly burlesqued by Steele in the Spectator of March 14, 1712. It is in the form of a letter to that periodical, signed T. B. The spelling and capitals are Steele's:

"Dear Sir;

'I beg you to print this without Delay, and by the first Opportunity give us the natural Causes of Longing in women; or

'put me out of fear that my Wife will one time or other be de-
'livered of something as monstrous as anything that has yet ap-
'peared to the World; for they say the child is to bear a Resem-
'blance of what was desired by the Mother. I have been marry'd
'upwards of six Years, have had four Children and my Wife is
'now big with the fifth. The Expences she has put me to in pro-
'curing what she has longed for during her Pregnancy with them,
'would not only have handsomely defray'd the Charges of the
'Month, but of their Education, too; her Fancy being so exorbi-
'tant for the last Year or two, as not to confine itself to the usual
'objects of Eatables and Drinkables, but running out after Equi-
'page and Furniture, and the like Extravagancies. To trouble
'you only with a few of them: When she was with Child of Tom,
'my eldest Son, she came home one day just fainting, and told
'me she had been visiting a Relation, whose husband had made
'her a Present of a Chariot and a stately pair of Horses; and that
'she was positive she could not breathe a Week longer, unless
'she took the Air in the Fellow to it of her own within that time;
'This, rather than lose an Heir, I readily comply'd with. Then
'the Furniture of her best Room must be instantly changed, or
'she should mark the Child with some of the frightful Figures in
'the old-fashioned Tapestry. Well, the Upholsterer was called,
'and her Longing saved that bout. When she went with *Molly*,
'she had fixed her Mind upon a new Set of Plate and as much
'China as would have furnished an *India* Shop. These also I
'cheerfully granted, for fear of being Father to an *Indian Pagod*.
'Hitherto I found her Demands rose upon every Concession;
'and had she gone on I had been ruined; but by good Fortune,
'with her third, which was *Peggy*, the Height of her Imagination
'came down to the Corner of a Venison Pasty, and brought her
'once even upon her knees to gnaw off the Ears of a Pig from the
'Spit. The Gratifications of her Palate were easily preferred to
'those of her Vanity; and sometimes a Partridge or a Quail, a
'Wheat-ear, or the Pestle of a Lark, were cheerfully purchased;
'nay, I could be contented though I were to feed her with green
'Pease in *April*, or Cherries in *May*. But with the Babe she now
'goes she is turned Girl again, and fallen to eating of Chalk, pre-
'tending 'twill make the Child's Skin white; and nothing will serve
'her but I must bear her Company, to prevent its having a Shade
'of my Brown. In this, however, I have ventur'd to deny her. No

'longer ago than yesterday, as we were coming to Town, she saw 'a parcel of Crows so heartily at breakfast upon a piece of Horse-'flesh, that she had an invincible Desire to partake with them, 'and (to my infinite Surprise) begged the Coachman to cut her off 'a Slice as if 'twere for himself, which the Fellow did; and as 'soon as she came home she fell to it with such an Appetite, that 'seemed rather to devour than eat it. What her next Sally will 'be I cannot guess; but in the meantime my Request to you is, 'that if there be any way to come at these wild, unaccountable 'Ravings of Imagination by Reason and Argument, you'd speedily 'afford us your Assistance. This exeeeds the Grievance of Pin-'Money, and I think in every Settlement there ought to be a 'Clause inserted that the Father should be answerable for the 'Longings of his Daughter. But I shall impatiently expect your 'Thoughts in this Matter, and am SIR

'*Your most Obliged and*

'*Most Faithful Humble Servant*

T. B.

'Let me know whether you think the next Child will love 'Horses as much as *Molly* does China Ware."—T.

Often, too, the woman will be subject to unusual degree of despondency; or a good-tempered woman may become peevish and irritable, while on the other hand, it sometimes occurs that a woman who is usually sharp-tempered and disagreeable becomes cheerful and kind. Cases have even been known in which a woman's household were accustomed to rejoice whenever she became pregnant, as she became so much more agreeable to live with.

The Diagnostic Value of all these changes is, however, but slight, and every one of them may easily be counterfeited on the one hand, or most of them concealed on the other. Also they may arise from a variety of causes other than pregnancy, and those of them which are known by the woman herself to be considered "signs," are liable to be brought on by the influence of the imagination, if she supposes herself to be pregnant.

Cases also are found in which none of these sympathetic disturbances take place, the woman continuing in good health, even in unusually good health, throughout the whole period of pregnancy.

Changes in the Breasts. Much importance is justly attached

to the changes in the Mammæ, or Breasts. About the second month the breasts generally increase in size, become tender, and feel as if they had lumps in them. Gradually they become larger and firmer, and are marked with blue veins. The Nipples swell up, and often are covered with little scales like fine bran, formed by the drying up of a milky serum, which oozes unnoticed from them. The Aureola, or dark spot around the nipple, becomes darker still; especially is this the case in dark-skinned women, in whom the Aureola sometimes becomes very dark brown, almost black, and never regains its original color. The dark circle sometimes extends over nearly the whole round swelling of the breast. The Aureola also becomes moist and somewhat swollen, and a number of little tubercles appear on it, forming a circle of projections around the nipple, and these increase in size and number as pregnancy advances. Montgomery says that some of the milk ducts open into these tubercles. In the later months of pregnancy there appears what is called the "secondary aureola." It consists of a number of lighter-colored spots in the margin of the darkened aureola, where the deposit of pigment, or coloring matter in the skin, is fainter. These, like the darkening of the aureola itself, is more marked in brunettes than in fair-skinned women. During these later months, too, there often appear on the breasts, especially in women whose skin is fine in texture, certain silvery-white streaks, caused by the stretching of the skin, and these remain.

Often even as early as the third month a small drop of watery-looking fluid may be pressed out from the nipple, which, on microscopic examination, is found to contain milk and globules of colostrum. Colostrum is the viscid, yellowish substance found in the breasts just after childbirth.

The time at which these changes occur varies a good deal in different persons. They may begin in two or three weeks, oftener not till the second or third month, and sometimes not until near the time of confinement. Sometimes no alteration whatever occurs in the breasts until after confinement, in which case no milk is found in them for several days after; and in some cases, particularly in the first pregnancy, the breasts do not change at all, and the mother cannot exercise the duty and pleasure of nursing her child.

Diagnostic Value of Changes in the Breasts. Various esti-

mates are put upon the value of these changes as evidence of pregnancy. Some physicians consider them, when clear and well marked, to be certain signs. But this rule must rather be confined to those women who have never borne children, and in them the evidence of these changes is almost absolute; for the diseases of the womb and ovaries, which sometimes produce the darkening of the aureola, do not produce the other changes mentioned. In women who have borne children, however, the value of these signs is considerably less, for the aureolæ usually remain permanently darker after the first pregnancy. In first pregnancies the presence of milk in the breasts may be considered an almost certain sign, and one which may nearly always be detected very early in the pregnancy. Even as to this, too, it must be said that there are well authenticated instances of not only non-pregnant women, but virgins, developing a secretion of milk by merely exciting the breasts. Baudelocque showed to the Academy of Surgery at Paris a young girl, only eight years of age, who had nursed her little brother for more than a month. A milky secretion has even been noticed in the male breast, and a story is told of a negro man on a Southern plantation who wet-nursed all his master's children. But these extraordinary and unnatural cases are so extremely rare that they take away nothing from the general value of this evidence of pregnancy.

In the breasts of women who have borne children, the presence of milk counts for very much less as a sign of a new pregnancy, for it is common for milk to remain in the breasts even for several years after nursing has ceased. However, in cases where a woman while nursing has become liable to impregnation, it often happens that the milk *ceases* on conception taking place.

Other Color-changes in the Skin. A change very commonly observed is the appearance of a brownish line, more or less dark in color, beginning in the hair of the pubes and running up to the navel, or sometimes beyond it. This line is well marked in women of Negro blood, even in those of quite a dark shade; and in them it is usually narrower, but darker than in white women. In many pregnant women this sign is never present at all, while in some others it is so light in color as to be scarcely noticeable. Sometimes brownish patches appear on the face, chiefly on the forehead, giving it a peculiar mottled appearance.

Movements of the Fœtus — Quickening. This well-known

symptom usually occurs about the end of the fourth month, though some women observe it as early as the third, and others not till the sixth month. In some rare cases there is no movement till the eighth or ninth month, and in others none at all. It is usually felt at first as a slight fluttering sensation, which, as the end of pregnancy approaches, increases to active, sometimes violent, movement, even causing the woman great distress. There are periods of activity, succeeded by periods of repose, occurring from four or five to eight or ten times or more in the twenty-four hours, as if the child passed part of its time asleep. In many cases these movements come on upon change of position, as when the mother lies down. Shortly after the period of "quickening," the movements of the fœtus become sufficiently strong to be felt by the hand placed on the outside of the abdomen, and later they may be seen sometimes even through the clothing.

The value of these movements as a sign of pregnancy vary a good deal. At the earlier stages the action of the gas in the flatulent bowels may be mistaken for the quickening, but in the later months they often become so strong and characteristic as to be quite unmistakable. Some persons have been able to counterfeit them by means of muscular movements, a sort of *dans du ventre*, and to thus impose on the credulous. Others again have been deceived by the movements of gas in flatulency, and fondly imagined themselves pregnant when they were not. A notable case of self-deception is that of Queen Mary I., of England, of whose case Hume, the historian, writes thus (Vol. III., p. 413): "The Queen's extreme desire of having issue had made her fondly give credit to any appearance of pregnancy; and when the Legate was introduced to her, she fancied that she felt the embryo stir in her womb. Her flatterers compared this motion of the infant to that of John the Baptist, who leaped in his mother's belly at the salutation of the Virgin. Despatches were immediately sent to inform foreign courts of this event; orders were issued to give public thanks; great rejoicings were made; the family of the young prince was already made; for the Catholics held themselves assured that the child was to be a male; and Bonner, bishop of London, made public prayers be said, that heaven would please to render him beautiful, vigorous and witty. But the nation still remained somewhat incredulous, and men were persuaded that the Queen labored under infirmities, which

rendered her incapable of having children. Her infant proved only the commencement of a dropsy, which the disordered state of her health had brought upon her. The belief, however, of her pregnancy was upheld with all possible care, and was one artifice by which Philip endeavored to support his authority in the kingdom."

The term "*quickening*," meaning *becoming alive*, arose from the ancient notion that then for the first time the fœtus became alive. Of course modern knowledge of physiology has dispelled this absurdity.

Changes in the Abdomen. The first sign of pregnancy usually noticed by the ordinary observer is the increasing size of the abdomen, leaving "The Maiden girdle all too short"; and pregnant women who wish to conceal the fact are driven to various expedients to hide this development. In the first two months the abdomen is generally *less* prominent than usual, the recession and flat appearance being caused by the sinking of the womb into the pelvis by its increased weight. Then about the third a swelling often shows itself in the lower part of the abdomen, only to diminish again, and leave the wife to fear that she was mistaken in supposing herself pregnant, because she sees herself smaller at the fourth month than at the third; but this does not always happen. From this time, however, the abdomen gradually increases in size and firmness. Sometimes the peculiar appearance is more noticeable in the increased *width* of the waist, or rather, of the back of the waist, as viewed from the rear, than in any alteration apparent from a front view. The swelling of the abdomen, too, is pear-shaped, with the larger end of it upwards, which distinguishes it from the swelling caused by dropsy. Later still, as pregnancy progresses, the hollow of the navel at first becomes deeper and drawn downwards, then it gradually fills out and as term approaches, protrudes beyond the level of the surrounding parts. This pouting appearance is very characteristic of pregnancy.

Sometimes, however, an increase of the size of the abdomen occurs for other reasons. Often, as the change of life approaches, women begin to take on a thick layer of fat on the abdomen, and the swelling thus caused, together with the cessation of the menstrual flow and the nervous disturbances which frequently characterize this period, sometimes persuades those who have been childless that at last their hopes are to be gratified. But as the changes in the breasts and in the skin, as above described, do not occur, there is no need for self-deception in the matter.

PLATE XVI.

Fig. 1.

Fig. 2.

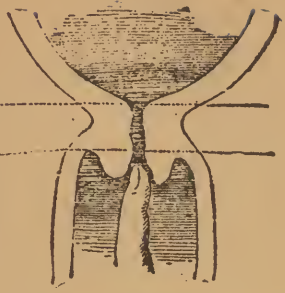
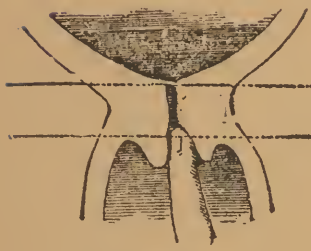
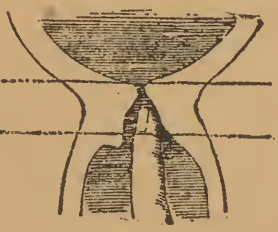


Fig. 3.



'First child.'

Fig. 4.



Woman who has borne children.'

Fig. 5.

Primipara, or the first Pregnancy.

Fig. 6.

Woman who has borne children before.

Fig. 1. Neck of the Womb at end of fifth month in a first pregnancy, very slightly opened (one-third natural size). Fig. 2. Neck of the Womb in a woman who has borne children, considerably more opened than in the first case. Figs. 3 and 4 the same as Figs. 1 and 2, but at end of seventh month. The part of the Womb below the upper line is the Cervix, or Neck. That below the lower line is the part contained in the Vagina. It will be noticed that it is shorter and thicker in one who has borne children, than in one whose pregnancy is her first.

CHAPTER XV.

HYGIENE OF PREGNANCY.

THE pregnant woman has in all ages been treated, at least by the better class of people of the ages, with the greatest kindness and deference. In some places she has even been made the object of religious reverence, as the symbol of the supposed great first cause.

In ancient Rome she signified her condition by wearing a girdle about her waist, called a *cinctus* or *cinctura*, hence the French word *enciente* (in the cienture, or girdle), meaning pregnant; and while all other persons were obliged to respectfully rise to their feet while a magistrate passed, these matrons were excepted.

The Spartan Lawgiver, Lycurgus, compared those women who died in childbirth to men who died on the field of battle in their couutry's wars, and they were accorded honorable epitaphs. Amongst the Jews she was excepted from their more arduous ceremonial observances and abstinences, and the law of Moses denounced the penalty of death against anyone who, by ill-treatment, caused a pregnant woman to miscarry. At Athens, her house was a sanctuary, and even a murderer, who fled there for refuge, might not be molested while he remained there, lest the disturbance caused by an arrest might do her or her burden an injury. In Pannonia, a man meeting a pregnant woman unprotected on the road was obliged to turn back and escort her safely to her destination. The Catholic Church in all ages has excused pregnant women from observing fasts. In nearly all countries, from ancient Egypt to the present time, if a pregnant woman be convicted of a capital offence, the execution is postponed until the child is born, the fact of pregnancy being inquired into and established by a jury of matrons.

At the present day we may fairly say that little more cogent evidence need be sought of an ignorant and uninstructed mind, and an unrefined disposition, than a disrespectful treatment of pregnancy; and the sneer and laugh with which it is sometimes greeted, not only by course and ill-bred young men, but even by young women, and sometimes older women, sufficiently show the sneerers' essential vulgarity. Happily, however, the prospective

mother is usually treated with the greatest respect and kindness, every gentleman and lady, though strangers, seeking to make her comfortable and to protect her from accident. And very properly it is so, for the pregnant woman bears within her the perpetuation of our race.

While, then it is the duty of everyone, and the pleasure of most people, to treat the pregnant woman with respect, deference and solicitude, it is equally her duty to know how to take care of herself and of her unborn child, and to act accordingly. And since the child is powerfully influenced in all its future career by what it acquires of good or ill from its mother during the period of gestation, it follows that she owes it to her offspring to see to it that no act or omission of hers shall result in handicapping him in the race of life.

Regarding food, but two things need be said; it should be abundant and taken frequently. The appetite is usually a safe guide, and its demands may be followed, except when a perverted desire for things unquestionably unwholesome, or unfit for food, should appear, such as pickles, except in very small amount, vinegar, chalk, and such things. The appetite is generally good; even in those cases in which the morning sickness is severe, the appetite is usually good in the afternoons. The mother has to provide sustenance for herself, and also for the nourishment and rapid growth of the fœtus; and a good food supply must be taken and digested, or the fœtus, or the mother herself, or both, will suffer from innutrition. The insufficiency of food amongst the very poor is often responsible for the puny, rickety bodies of their new-born babes, the food taken by the mother being so limited in quantity and poor in quality that the infants' bones and muscles are not half nourished. Plain wholesome food is to be preferred, meats, vegetables and fruits, avoiding highly-seasoned and stimulating foods, pastry, and all wines, ale, beer and other alcoholic beverages.

It is better also to eat a moderate quantity four or five or even six times a day than to indulge *very* heartily at ordinary meal-times, the very full meal not only being more difficult of digestion, but causing the stomach to press unnecessarily upon the other already crowded internal organs.

The clothing during pregnancy should be carefully attended to. It may be laid down as a general rule that during the latter

months especially flannel underclothing should be worn, as the body is more than usually susceptible to chills and to ill effects from them, and woolen garments afford a much better protection against sudden changes of temperature than cotton, linen or silk. It would seem hardly necessary to say that the clothing should leave the body perfectly free to expand; but such is the peculiar trend of some people's vanity that they even attempt to crowd the fœtal swelling out of sight by means of corsets. During the first three or four months, it is true, there is little increase in size, but after that the increase is constant and rapid, and any compression by either clothing or corsets is not only liable to injure the fœtus, but to cause varicose veins, swelling of the feet, and other disturbances arising from impaired circulation. The clothing everywhere should be very loose and suspended from the shoulders. Even the stockings should be held up by elastic suspenders fastened to the upper garments, for the circulation, especially in the later months of pregnancy, is especially difficult in the lower limbs, and even the slight obstruction of a moderately tight circular garter is better avoided.

Cleanliness is, of course, very important, but great care should be taken in bathing. Neither very hot nor very cold baths should be taken at all, nor should the shower bath. Sea bathing also should be avoided, as from the excitement sometimes attending it, the low temperature of the water and the buffeting of the surf, it is liable to cause miscarriage. Probably a daily sponge bath in a warm room, with a lukewarm full bath once or twice a week, is about the best course to adopt.

Sleep is of unusual importance during the period of pregnancy. Usually the woman desires more sleep than at other times, and she should be allowed to have it; by all means she should go to bed reasonably early, and also indulge the inclination to lie in bed late in the morning. Often she is disposed to take occasional or regular naps during the day, and by all means she should do so, as the more she can conserve her vitality the more she can expend upon the proper development of the new being.

It quite often happens, in the later stages of pregnancy, that the pressure of the womb toward the lungs when she lies down causes a sense of suffocation. This can be partly or quite relieved by supporting the head and shoulders pretty high on pillows. Sleeping on feather beds is apt to be injurious, as it pro-

motes excessive warmth, and is liable to produce flooding and miscarriage. A hair or sponge mattress is better.

Care should be taken to keep the *bowels* regular and open, but by no means should any violent purgative be used, or miscarriage may result. The desire to urinate frequently is usually present, owing to the pressure of the gravid womb on the bladder. These calls should be attended to, or irritation of the bladder, and, through it, of the womb, may result.

The *Breasts* also require some attention, especially during the first pregnancy. Their rapid increase in size is sometimes attended with considerable pain and distress for a time, and some anodyne lotion is sometimes applied under the physician's direction. A little gentle friction, rubbing from the body outward towards the nipple, is often used with good results, and it tends also to prevent that retraction of the nipple, which is often observed in first pregnancies. A mixture of glycerine and cologne water, or glycerine alone, rubbed on the nipples, will prevent them from becoming sore, and a little alum may be added to it a week or two before delivery. If the nipples show any disposition to become sore and crack, they should be protected from the rubbing of the clothing by the use of nipple shields.

MISCARRIAGE.

A fruitful source of disease, though too often considered too lightly, is premature delivery, commonly called *miscarriage*. It is, unfortunately, a rather frequent than rare occurrence, it being estimated that at least ninety out of every hundred women who become mothers, and live to the change of life, have one or more miscarriages. A woman who marries at forty is very much more likely to miscarry than if she had married at thirty, in which case she might have borne children safely, not only before, but after, forty years of age. As a woman, even one who has borne a family of children, approaches the change of life, when she will cease childbearing, she is very apt to finish with a miscarriage. Also, there is more danger of miscarriage in first pregnancies than in any other, except the latest. A very nervous or a very full-blooded woman is particularly apt to miscarry with her first child.

Miscarriage is most frequent from the first to the third month of pregnancy, and about the sixth month. Also, it is found that a woman who has frequently been so unfortunate, has nearly always miscarried at about the same period.

A woman who becomes pregnant while nursing is, if she continue nursing, very liable to miscarry; and for this reason, when a nursing mother finds herself pregnant, she should wean the child at once, both for her own sake and for the sake of the children, born and unborn; and even if abortion do not ensue, she is unfit to properly nourish all three.

The question, *how early can a child live?* often becomes one of great importance, not only from an obstetric point of view, but from a legal. For the answer to the question of the date of a child's conception, which has lived even for a short time, may answer the question of his legitimacy or illegitimacy, and the title to rank or property.

The English law gives no specific answer to the question. The French law fixes the limit at one hundred and eighty days, and regards a child born that distance of time after marriage as not only capable of living, but presumptively legitimate. Many curious cases are mentioned by the old medical writers of children born earlier than one hundred and eighty days an surviving. Van Swieten records the case of Fortunio Liceti, who was born before the sixth month, in consequence of a fright his mother had at sea. It is said that he was the size of a hand when born, but his early coming seems not to have hastened his going, for he lived till his seventy-ninth year. A case mentioned by Professor G. S. Bedford, of New York, was that of a female infant born before the sixth month, and which weighed two pounds nine ounces at birth. The skin was perfectly scarlet in color. It breathed, and shortly after birth cried freely. It was wrapped in soft cotton soaked with sweet oil, and fed with its mother's milk, a few drops at a time being put into its mouth. Though at first it swallowed with difficulty, it soon became able to take sufficient nourishment, and grew into a healthy, vigorous young woman.

Miscarriages, though not so apt to produce immediate fatal consequences to the mother as confinement at full term, are much more likely to produce disease of the womb. As term approaches, the neck of the womb becomes very soft and elastic, so as to let the fœtus pass out with comparative freedom at confinement, but when a miscarriage occurs after the fœtus has attained any size, the neck of the womb, being still comparatively firm, is apt to be torn in delivery. Also, at full term, the decidua and placenta have become, as it were, ripe, their attachments to the womb

having degenerated so as to let them pass away easily; but when a miscarriage occurs these are not yet ready to separate from the womb, and either there is laceration in tearing them away, or they remain and cause a danger of blood-poisoning, as they loosen slowly by decay or other degeneration.

Where a miscarriage has occurred, as well as after a natural confinement, sexual intercourse is best avoided for a couple of months.

The *Causes* of Miscarriage are various. Sometimes the irritation of piles or dysentery, whether natural or from purgative medicine, or straining at stool, will provoke it. Excessive venereal intercourse by the newly-married is a very frequent cause. Sea bathing will sometimes cause it. Continuing to nurse when conception has taken place during nursing is very apt to cause it; and the observation of an eminent physician showed that seventeen per cent. of the conceptions which occurred during nursing were followed by miscarriage, while only ten per cent. of pregnancies in women who were not nursing met with this misfortune. Amongst the causes mentioned by Napheys are the following: "The extraction of a tooth, over-exertion and over-excitement, a fall, a blow, any violent emotion, such as anger, sudden and excessive joy, or fright, running, dancing, horseback exercise, or riding in a badly-built carriage over a rough road, great fatigue, lifting heavy weights, the abuse of purgative medicines, disease or displacement of the womb, small-pox, or a general condition of ill-health, are all fruitful and well-known exciting causse of this unfortunate mishap." Railroad journeys also he considered objectionable from this point of view. Conception occurring in a woman suffering from Syphilis in the first stages is almost sure to be followed by miscarriage, as is also the contraction of that disease during the first six or seven months of pregnancy. Any skin disease, such as is followed by peeling off of the skin, as small-pox, scarlet fever, measles, etc., is very apt to produce abortion. A woman who has miscarried two or three times in succession may acquire a *habit* of miscarriage, such that it becomes very difficult to prevent it, and in each successive conception, when the period arrived when abortion took place before, it will occur again.

Notwithstanding the very slight causes which will sometimes bring on this misfortune, pregnant women have been known to undergo the most astonishing ill-treatment, and still retain the fœtus. For example, a noted Scotch physician relates that his coachman once accidentally drove over a woman who was in the

eighth month of pregnancy and injured her severely. Yet, greatly to the doctor's surprise, the pregnancy was not disturbed, and she gave birth to a healthy child in due time at full term.

The *Symptoms* of threatened or actual miscarriage vary with the period of pregnancy. In the first month or two there is little to distinguish an abortion from a painful menstruation, and it frequently happens that abortion occurs before there is any very clear and positive symptom of pregnancy. At this earlier period the only sign of an abortion is an excessive flow, containing probably clots of blood; and the embryo, being still very small, is contained in a blood clot, and passes away unnoticed. From the standpoint of the mother's health, it is of less consequence at this earlier period than later, the embryo being so small as to cause no laceration, but it is, nevertheless, important to recognize a miscarriage when it occurs, that the subsequent conduct may be governed accordingly. As soon as conception takes place, the womb begins to grow, and, by the end of the first or second month, has increased considerably in size; and any excitement of it, until it has resumed its ordinary size and has had time to rest from its labors and misfortunes, is highly improper. For this reason sexual intercourse should be avoided for a couple of months, or at least a month. Also it is important to recognize a miscarriage as such, in order that on the next pregnancy extraordinary care may be taken as the critical period approaches, lest a *habit* of miscarriage be set up. Therefore, if there be any reason to suspect pregnancy, as if after missing one or two menstrual periods there occurs what appears to be a painful menstruation, with excessive discharge, and perhaps clots of blood, the woman should remain in bed and avoid all physical and mental exertion for a few days or a week after the flow has ceased.

Miscarriage occurring later than about the tenth week is a more serious matter, and the symptoms are much more severe. The chief symptoms are *pain* and *flooding* (that is, a profuse flow of blood). Often, however, the first symptoms are a severe chill, followed by fever, thirst and nausea. Sometimes these symptoms are accompanied by palpitation of the heart, coldness of the feet, and dizziness. After some hours, or days, there is usually pain in the lower part of the back and abdomen, often shooting down the thighs. At first the pain is continuous, then becomes periodic in character, like true labor pains.

The Avoidance and Prevention of Miscarriage are readily suggested by a consideration of the exciting causes. Dr. Tilt says: "The way to prevent miscarriage is to lead a quiet life, particularly during those days of each successive month when, under other circumstances, the woman would menstruate; and to abstain during those days, not only from long walks and parties, but from sexual intercourse." Dr. Bedford, of New York, too, says that in cases where miscarriage threatens to become habitual, he has found it an excellent practice to interdict all sexual intercourse until after the fifth month; for if the pregnancy pass beyond this period, the chances of miscarriage will be much diminished It is even worth while, where a habit of miscarriage, at a certain stage of pregnancy, has been set up, for the woman to take to bed as that time approaches, and to remain there for some days, or even weeks, until that critical period is past. The most obstinate habit of miscarriage can be overcome in that way, and where one child is, by the adoption of even this means, carried to full term, the chances of subsequent miscarriage are much lessened.

A good general rule for warding off a threatened abortion is this: Whenever flooding occurs, whether accompanied by pain or not, the woman should at once lie down, send for a physician, and remain lying down and as still in bed as possible, avoiding all excitement, until his arrival.

BIRTH-MARKS, OR MOTHER'S MARKS.

The popular belief in the influence of the mind, or imagination of the mother upon her unborn child, is humorously illustrated in the Letter from the Spectator, quoted in Chapter XIV. But so very many physiologists of eminence attach an importance to this influence, that we cannot deny that it is worthy at least of careful attention. Scientifically, some of the cases cited may be difficult or impossible to account for, but the authenticity of the sources of information is, in very many instances, such that unbelief is well-nigh impossible.

The power of the mind over the body is well known; many a man has become sick or well, has been attacked by specified diseases, or cured of them, wholly by the power of his imagination. Yet the disease was perfectly real and the cure real. The hair has frequently been known to turn white in a few days, or even in a few hours, under the influence of strong mental emotion; of

this Marie Antoinette, Queen of France, who perished in the French Revolution of 1792, is a notable example.

Every school boy knows, and most of them entertain the common belief, that warts may be cured by some nonsensical incantations, or by the application of absurd remedies. Readers of Mark Twain's works will remember the magic spells, by means of which Tom Sawyer got rid of those excresences.

Nevertheless, there are not wanting those who venture to disbelieve, to a great extent, in these prodigies; among these incredulous is numbered no less an authority than Dr. W. S. Playfair, the eminent English writer on obstetrical subjects, who does not hesitate to declare that in most, if not all, these cases, except those of idiocy and the like, the extraordinary circumstance occurring during pregnancy only impressed itself with particular strength upon the mother's mind from the hour when she saw its supposed *effect* on the child after its birth.

At the same time, the cases are very interesting, and a few of them may be cited. I quote from Dr. Napheys' excellent work on "The Physical Life of a Woman." Dr. Napheys, I have to say, was a firm believer in "Mother's Marks," but it is to be noted that this very careful and accurate observer does not assert that any such cases were ever investigated by himself and found beyond doubt. Says he: "There are numerous facts on record which prove that habitual, long-continued mental conditions of the mother at an early period of pregnancy, induce deformity or other abnormal development of the infant."

Professor William A. Hammond, of New York, relates the following striking case, which occurred in his own experience, and which scarcely admits of a doubt as to the influence of the maternal mind over the physical structure of the fœtus:

"A lady in the third month of her pregnancy was very much horrified by her husband being brought home one evening with a severe wound on the face, from which the blood was streaming. The shock to her was so great that she fainted, and subsequently had a hysterical attack, during which she was under Dr. Hammond's care. Soon after her recovery, she told him that she was afraid her child would be affected in some way, and that even then she could not get rid of the impression the sight of her husband's bloody face had made upon her. In due time the child, a girl, was born. She had a dark red mark upon her face, corres-

ponding in situation and extent with that which had been upon her father's face. She also proved to be idiotic."

Professor Dalton, of New York, states that the wife of the janitor of the College of Physicians and Surgeons of that city, during her pregnancy, dreamed that she saw a man who had lost a part of the ear. The dream made a great impression upon her mind, and she mentioned it to her husband. When her child was born, a portion of one ear was deficient, and the organ was exactly like the defective ear she had seen in her dream. When Professor Dalton was lecturing upon the development of the fœtus, as affected by the mind of the mother, the janitor called his attention to the foregoing instance. The ear looked exactly as if a portion had been cut off with a sharp knife.

Professor J. Lewis Smith, of Bellvue Medical College, New York, has met with the following cases: An Irishwoman, of strong emotions and superstitions, was passing along a street, in the first months of her pregnancy, when she was accosted by a beggar, who raised her hand, destitute of thumb and fingers, and "in God's name" asked for alms. The woman passed on, but reflecting in whose name money was asked, felt that she had committed a great sin in refusing assistance. She returned to the place where she had met the beggar, and on different days, but never afterwards saw her. Harassed by the thought of her imaginary sin, so that for weeks, according to her statement, she was distressed by it, she approached her confinement. A female infant was born, otherwise perfect, but lacking the fingers and thumb of one hand. The deformed limb was on the same side, and it seemed to the mother to resemble precisely that of the beggar. In another case which Professor Smith met, a very similar malformation was attributed by the mother of the child to an accident occurring, during the time of her pregnancy, to a near relative, which necessitated amputation. In May, 1868, he removed a supernumerary thumb from an infant, whose mother, a baker's wife, gave the following history: "No one of the family, and no ancestor, to her knowledge, presented this deformity. In the early months of her pregnancy she sold bread from the counter, and nearly every day a child with a double thumb came in for a penny roll, presenting the penny between the thumb and finger. After the third month she left the bakery, but the malformation was so impressed upon her mind that she was not surprised to see it reproduced in her infant."

"It is related on good authority that a lady, who during her pregnancy, was struck with the unpleasant view of leeches applied to a relative's foot, gave birth to a child with the mark of a leech coiled up in the act of suction on the intended spot."

Dr. Delacoux, of Paris, says that in the month of January, 1825, he was called to attend a woman in the village of Batignoles, near Paris, who the evening before had been delivered of a six-months' fœtus, horribly deformed. The upper lip was in a confused mass with the jaw and the gums, and the right leg was amputated at the middle, the stump having the form of a cone. The mother of this being, who was a cook, one morning, about the third month of her pregnancy, on entering the house where she was employed, was seized with horror at the sight of a porter with a hare-lip and an amputated leg.

At a meeting of the Society of Physicians, at Berlin, in August, 1868, Herr Dupré stated that a woman saw, in the first weeks of her third pregnancy, a boy with a hare-lip; and not only was the child she then carried born with a frightful hare-lip, but also three children subsequently. Another one, a woman in the fifth week of pregnancy, saw a sheep wounded and with its bowels protruding. She was greatly shocked, and did not recover her composure for several days. She was delivered at term of a child, in other respects well developed, but lacking the walls of the abdomen.

A black child is generally believed to have been born to Marie Therese, the wife of Louis XIV., in consequence of a little negro page in her service having started from a hiding place and stumbled over her dress early in her pregnancy. This child was educated at the convent of Morel, near Fontainebleau, where she took the veil, and where, till the shock of the revolution, her portrait was shown.

A woman gave birth to a child with a large cluster of tumors growing from the tongue, and preventing the closure of the mouth; in color, shape and size exactly resembling our common grapes; and with a red excresence from the chest, as exactly resembling in figure and appearance a turkey's wattles. On being questioned before the child was shown to her, she answered that while she was pregnant she had seen some grapes, longed intensely for them, and constantly thought of them; and that she was also once attacked and much alarmed by a turkey-cock.

Dr. Demangeon, of Paris, quotes, in his work on the Imagination, the *Journal de Verdun*, as mentioning the case of a child born at Blois, in the eyes of which the face of a watch was distinctly seen. The image was situated around the pupil, and the figures representing the hours were plainly perceived. The mother had experienced a strong desire to see a watch while she was pregnant with this child.

Dr. Russegger reports that a woman, who had already borne four healthy children, was in the seventh month of her pregnancy bitten in the right calf by a dog. The author saw the wound made by the animal's teeth, which wound consisted of three small triangular depressions, by two of which the skin was only slightly ruffled; a slight appearance of blood was perceptible in the third. The woman was at the moment of the accident somewhat alarmed, but neither then nor afterwards had any fear that her fœtus would be affected by the occurrence. Ten weeks after she was bitten the woman bore a healthy child, which, however, to the surprise of every person, had three marks, corresponding in size and appearance to those caused by the dog's teeth in the mother's leg, and consisting, like those, of one large and two smaller impressions. The two latter, which were pale, disappeared in five weeks; the larger one had also become less, and was not so deep-colored as it was at birth. At the time of writing the child was four months old.

Dr. S. P. Crawford, of Grenville, Tennessee, reported in the *Nashville Journal of Medicine* the following sad case: A lady, in the last stage of pregnancy, was burned by the explosion of a kerosene oil can. She lived twelve hours after the accident. The face, legs, arms and abdomen were badly burned. The movements of the child were felt three or four hours after the accident. A short time before the death of the mother she gave birth to the child at full maturity, but still-born. It bore the mark of the fire corresponding to that of the mother. Its legs, arms and abdomen were completely blistered, having all the appearance of a recent burn.

A lady living on Maitland street, Toronto, during pregnancy, had a disease of the leg which had necessitated a surgical operation. In the operation a large cut was made, extending several inches up and down the inside of the leg, just above the ankle. During her pregnancy this gave her a good deal of trouble and

distress. When her child was born he had a brown mark on the inside of his leg corresponding in location and extent to that of the mother. It was covered with a thick growth of short stiff hair; and it continues the same, though the boy, at time of writing, is about fourteen years old.

A woman living on Lincoln avenue, Detroit, was, during pregnancy, greatly frightened by the conduct of her husband's brother, who came to the house in a state of gross intoxication. Her child, a boy, when old enough for it to be distinguished, proved an imbecile, his imbecility taking the appearance of intoxication. He learned to walk, but walks with the reeling, staggering gait of a drunken man. He seems tortured by an unquenchable thirst, and though, of course, not allowed a drop of intoxicants, he habitually drinks large quantities of water; then vomits, like his inebriated uncle did, when the boy was yet in his mother's womb.

Nearly every woman you meet can cite you numerous cases in support of the belief in Mother's Marks. Yet it must be said that witchcraft, in its time, had just as great names at its back, and belief in it was supported by as numerous instances and on as unimpeachable authority. Two undoubted facts detract a little from the force of the illustrations which may be found in such numbers on every hand. There are very many frights, excitements, impressions, longings, etc., experienced by pregnant women every day; nearly every pregnant woman has more or less of such; yet in a very small minority of cases is there anything unusual about the child. On the other hand, there are many peculiarities, birth-marks and deformities of mind and body for which no reason can be assigned by the mother. If these causes produce such effects in one case, why should they not in all? If the woman who longs for grapes produces a child with a deformity like a bunch of grapes in its mouth, why should not the woman who longs for a watermelon bring forth offspring with an appendage of that sort adorning its mouth? And why should not the woman who longs to go to a circus give birth to a menagerie? If the theory be good for anything, its operation should be the rule, and not the scarce exception. Also, if peculiarities are to be accounted for in that way, why are there so many similar peculiarities, the majority of them, in fact, which cannot be accounted for in that way?

The writer, while not venturing to express utter disbelief in the theory, suggests that most of the cases depend on insufficient evidence of their early history. The mother and, perhaps, other relations, seeking to account for a deformity in her offspring, of which she is, though in one sense unjustly, ashamed, relates circumstances which were more the product of the imagination and of the desire to find something extenuating, than of the unbiased memory.

There is no doubt, however, of this, that the influence of impure or corrupted blood upon a fœtus, developing and adding new tissue to muscle and bone, and nerve and brain every day, is far greater than the influence of such blood upon the mother; and, as all sights and sounds, all impressions of good or evil which anyone gets, affect the condition of the blood through the nerve supply, it is highly necessary that the mother who supplies such blood, good or bad, as she has, to the fœtus, should carefully avoid all sights, sounds, thoughts, actions and impressions, whose tendency would be to any but the most pure and agreeable emotions.

CHAPTER XVI.

DURATION OF PREGNANCY.

THE *average* length of time from conception to delivery at full term is two hundred and eighty days, forty weeks, or ten lunar months. Yet it must be remembered that this is only the *average*, and, that there may be and are many regular confinements at considerably shorter or longer periods.

This is important to bear in mind, and, if known generally, would cheat scandal-mongers of many a choice bit of gossip, and would save the honorable and deserved reputation of many families. Sometimes, too, the question of the legitimacy of the child, and with it the title to rank and property, depends on the question: How long or how short may fully accomplished gestation be?

An illustration of this is furnished by the famous Gardner Peerage case, tried by the English House of Lords in 1825. Allen Legge Gardner and Henry Fenton Iadis (or Gardner) were rival claimants to have their names inscribed as peers on the Parliament Roll. The circumstances were these: On the 30th of January, 1802, Lord Gardner left England and his wife, and went to the West Indies. He did not see Lady Gardner again until 11th July following. The child, afterwards called Henry Fenton Iadis, was born on the 8th December of the same year, and was unquestionably arrived at full maturity when born, so that he could not possibly have been the result of intercourse on or after Lord Gardner's return, on 11th July. But the time from January 30, the last date when intercourse with her husband was possibly had previously to July, to December 8, was three hundred and eleven days. The question then was: Was pregnancy protracted to this extraordinary length—thirty-one days beyond the usual time,—or was this child necessarily the offspring of adulterous intercourse, had in Lord Gardner's absence? No less than sixteen medical witnesses were examined on this point, being the most eminent obstetricians in the kingdom; they were d vided in opinion, eleven averring that gestation might be protracted to a period which would cover the birth of this child, and five being of the contrary opinion.

In this case, however, as it was proven that she had been

guilty of adultery with a Mr. Iadis, the House declined to stretch the probabilities to let in the doubtful issue, and declared him illegitimate. Allen Legge Gardner, who was Lord Gardner's son by a second marriage (the first wife, mother of Henry Fenton Iadis, having been divorced), was declared entitled to succeed to his father's title.

A remarkable case reported by Dr. Desormeaux, of Paris, establishes beyond doubt the possibility of a protraction of pregnancy beyond two hundred and eighty days. This case came under his own notice in the Hospital de Maternite, in that city. A woman, the mother of three children, became insane, and her physician thought that a new pregnancy might recover her reason. Accordingly, her husband visited her, but only once every three months, and the visits were duly entered on the hospital register. The visits were discontinued as soon as evidence of pregnancy appeared, and the woman was confined two hundred and ninety days after the last visit.

This case, however, showing a protraction of only ten days beyond the usual time, is much less remarkable than some others, and it being the fact, as shown elsewhere in this book, that conception may take place some days after the intercourse, the excess of time may have been very few days.

Professor Charles D. Meigs, of Philadelphia, published a case, which he thought perfectly trustworthy, of a pregnancy prolonged to four hundred and twenty days, or sixty weeks, a half longer than the usual time, and Dr. Atlee reports two cases in which the period of gestation was nearly three hundred and fifty-six days. Professor Simpson, of Edinburgh, records four cases which he met in his own practice, of pregnancies extending to three hundred and thirty-six, three hundred and thirty-two, three hundred and twenty-four, and three hundred and nineteen days, respectively. Dr. Joynt, in the Dublin *Quarterly Journal of Medical Science*, records a case in which the evidence is positive that the pregnancy was not less than three hundred and seventeen days, or thirty seven days more than the average. In one hundred and sixty cases observed by Dr. Elsässer, eleven were extended to periods varying from three hundred to three hundred and eighteen days. On the other hand, not only may children born before their time in a comparatively undeveloped condition, live to grow up, but in some cases children are born considerably *earlier* than two hundred and eighty

days, but, nevertheless, at full term and fully developed. First pregnancies are usually from one to two or even four weeks shorter than subsequent ones. This has nothing to do with a desire to throw the mantle of charity over the newly-married, whose first child has appeared at two hundred and sixty-five or two hundred and seventy days after marriage, instead of the orthodox two hundred and eighty days, as it has been abundantly proven in numerous cases in which the birth, though the first, did not occur for a year or two, or even more, after marriage. A proper knowledge of this fact should still the tongues of those scandal-mongers who love to cast reproach on a young couple of unimpeachable character, because their first child was born less than two hundred and eighty days after marriage.

The causes of an extension or shortening of the usual term are not certainly known. Some have supposed that children carried a longer period are more developed than are those born at the forty weeks. This is sometimes but not always the case, and the reasons for the variation may be as difficult to state positively as the reason why one healthy apple may drop ripe off a tree, while another next it may be still quite greenish and firmly fastened, and may hang on for days or even weeks longer.

How to Calculate the Time of Expected Labor is often a matter of some interest. The rule suggested by Professor Naegele, of Heidelberg, is one easily applied, and is, on the whole, as satisfactory as any which could be adopted. It is this: The day of the cessation of the last monthly flow is noted; take the same date in the following year; subtract three months and add seven days. This will give a period of two hundred and eighty days from the time of conception, if, as is most commonly the case, conception takes place immediately after the cesser of the monthly flow. For instance, suppose that the last day of the last menstrual period before pregnancy began to have been June 15; then take June 15 of the following year, and subtract three months. This brings you to March 15; then add seven days, which brings you to March 22, the probable date of birth.

There are, however, many difficulties in the way of a strict calculation of the date when labor may be expected. One is, that with husband and wife it is usually difficult to say which of a series of copulations is the fruitful one. Also, as seen before, conception may take place some days after the fruitful intercourse.

Again, different women vary a good deal in their periods of gestation, and the same woman may vary from one time to another.

Dr. Merriman thinks the greatest number of women are delivered of their children during the fortieth week, and next to that in the forty-first week. Of one hundred and fourteen pregnancies, calculated by him from the last day of menstruation, and in which the children appeared to be fully matured, three deliveries took place at the end of the thirty-seventh week, thirteen in the thirty-eighth, fourteen in the thirty-ninth, thirty-three in the fortieth, twenty-two in the forty-first, fifteen in the forty-second, ten in the forty-third and four in the forty-fourth week.

CHAPTER XVII.

THE FATHER AND MOTHER DURING PREGNANCY.

The Marital Relation during Pregnancy. Dr. Napheys says: "During those days when the wife, if she were not pregnant, would be 'unwell,' marital intercourse should be abstained from. It is then injurious to the mother and dangerous to the life of the child, as it is liable to excite miscarriage. But if this habitual epoch of the monthly sickness be avoided, there is no reason why passion should not be gratified in moderation and with caution during the whole period of pregnancy. There is one exception to be made to this general course of conduct. In those cases in which a miscarriage has occurred in the first pregnancy, every precaution should be employed—for reasons which have been dwelt upon in a previous article—to prevent its happening again after the second conception. Under such exceptional circumstances, therefore, the husband and wife should sleep apart during the first five months of pregnancy. After that period their ordinary relations may be resumed. When a miscarriage has occurred, intercourse should not be permitted within a month of the accident. The observation of this direction is of the utmost importance. Its neglect is the frequent causes of severe and intractable diseases of the womb."

To this it may be added that, if a miscarriage have occurred in a previous pregnancy, even though later than the five months above mentioned, intercourse ought to be avoided for a few weeks before and after the same stage in the next pregnancy.

Dr. Hollick goes even further than Dr. Napheys, and holds that so far from such intercourse during pregnancy being improper in all cases, it is often *required*, and that various evils may result from its denial. He declares that when the temperament is warm, and the sexual instinct unusually strong, as it often is during pregnancy, indulgence is imperatively needed, and if it cannot be had the most injurious consequences may take place. He says that he has known instances of this kind to result in a peculiar nervous frenzy, or partial derangement, and in miscarriage.

But it seems to the writer that such erotic *mania* as Hollick describes is probably caused by some inflammation of the cervix, or neck of the womb, or of the nymphæ, and is a fitter subject for medical treatment than for amatory indulgence; and the latter, while affording temporary relief, might fairly be expected to aggravate the evil.

Certainly such intercourse should be strictly avoided, unless it be at least not disagreeable to the woman.

INFLUENCE OF SUCH INTERCOURSE UPON THE CHILD.

There are other reasons given by writers on this subject, for the continuance of connection after conception, which afford a curious study. These refer to the influence of such connection in impressing the characteristics of the father upon the child. I cannot do better, on this point, than to quote the curious cases and illustrations, cited by Dr. Hollick in his work on "The Natural History of Generation":

"Several intelligent breeders of birds and other animals had long remarked that the male could influence the offspring *after* conception as well as before, and they acted upon this knowledge practically, in the production and preservation of particular varieties. Dr. Delfraysse, of Cahors, in France, was the first, however, who recorded any special observations of this kind. He found that the first connection merely gave life, or impregnated the egg, and that the after connections imparted to the young the *colors* of the male, and that the more this after-connection was repeated, the more closely would the offspring resemble the father. In what way this effect is produced it is difficult, in the present state of our knowledge, to even surmise; but notwithstanding this the *fact* is one of great importance. It has been suggested that the resemblance to the male, observed in such cases, resulted from an effect upon the *imagination* of the female, through the medium of the sight, the colors being, as it were, impressed upon her mental vision. This, however, is not always the case at least, even if it be so occasionally, for a friend of mine, at my request, tried the experiment upon a hen that had been *blind* during the whole of her laying period, and in her case the chickens produced from her eggs invariably resembled the male in color; just in proportion to the frequency with which association took place. And in another instance, two heifers when put to the male, were both

blindfolded, one having but one connection and the other several. Each brought forth a calf—that from the mother which had but one connection resembling both the parents, but mostly the mother, while that from the other with which there had been several connections, resembled the male parent in almost every particular of color, marking and general appearance, though she had been carefully blindfolded each time. [The cogency of this illustration as an argument for the influence of connection after conception, is somewhat impaired by the fact, well known to stock-breeders, that some females almost invariably "breed after themselves," that is, produce offspring resembling themselves more strongly, while others regularly "breed after the male." The same rule applies to males, some of which nearly always beget "a little faithful copy of the sire," while often in others the dam's blood governs. The value of many a fine male for breeding purposes is destroyed or impaired by the fact that he seldom can transmit his admirable qualities to his progeny. The same fact has frequently been observed in the human family.] It is not through the imagination alone, therefore, that the paternal influence is exerted, though it may probably be so in some cases, as, for instance, in that of the Mare and the Quagga, recorded by Sir Everard Home. The Quagga is a species of Ass, striped like the Zebra, and one of these, a male, impregnated an English Mare in the Park of the Earl of Morton, in Scotland. There was but one connection, and the offspring was a Hybrid, or Mule, marked like the father. This Hybrid remained with the mare about four months, and probably she might also have seen it again about ten months afterwards. After this, during the next five years, she had four foals *by an Arabian horse*, and strange to say, though she had not seen the Quagga during this time, they were, nevertheless, all marked more or less like him Now if this singular resemblance was effected through the imagination of the mother, as Sir Everard supposes, the most wonderful circumstance is that the effect should endure so long even after the Quagga was removed. [This phenomenon is well known to breeders of horses and dogs, the sire of one birth impressing his character upon succeeding offspring through several successive pregnancies by other sires. They call this phenomenon by the term "throwing back."] There seems no reason to doubt that the same rule holds good in the human race. A remarkable example of this is that of a young Scotch-

woman, who was forcibly violated one dark night by a man whom she could not see and did not know. It became known, however, who he was, and though her friends kept the matter as secret as possible, they, nevertheless, forced him to go abroad, where he remained. Unfortunately she became pregnant by the intercourse, and the child, not unnaturally, resembled the father. She married another man some time after, and, strange to say, her two children, unquestionably the offspring of her lawful husband, *also resembled her violator.*

"In our own species, however, it is not in respect to the color of the skin that the influence of the male in after-connection is made manifest, so much as in the color of the hair and eyes, and in the expression of the features, though the peculiar tint of the father's skin, as to being light or dark, is often so imparted. Certain propensities, habits and modes of thought are also given in the same way. I have made many observations of cases in which all the necessary particulars were fully known to me, and invariably I have found that the child resembled the father in proportion to the frequency with which association was practiced after conception. The mere bodily resemblance seems to be most readily imparted, especially the color and expression of the eyes and the color of the hair."

From the foregoing it would seem to follow that if impregnation were consummated by one male, and, after conception, intercourse were frequently had with another male, the offspring should resemble the latter rather than the former, the real parent. This Dr. Hollick alleges to be the case, and says: "In one instance I knew a widow who secretly married in about three months after the death of her husband, and as it appeared afterwards, she was pregnant by him. The child, however, resembled her *second husband*, though there was almost a certainty that no previous infidelity had been practiced, because the individual was at a distance when the conception must have occurred."

I give these illustrations for what they are worth, though I am bound to say that Dr. Hollick is not only an able writer, but an unusually accurate and independent observer. The causes of the alleged influence can only be conjectured; but I should not think proper to leave out the influence of the imagination on such things, which, even in ancient times, was known and utilized. The case of the ring-streaked and speckled lambs and kids, pro

duced by Jacob's display of white-streaked, peeled rods at copulation-time (Genesis xxx., 31-42), is familiar to all readers of the Old Testament. Of course, in human beings this effect of the mind is likely to be much stronger than in the lower animals, and would probably have more such effect. It is related of a very eminent but very ugly citizen of Ancient Rome, that he was much distressed at finding his eldest-born child as ug'y as himself. Consulting a philosophical friend, he was advised to place a statue of Apollo in his wife's bed-chamber, at the foot of her bed, where she might look upon it when next he visited her bed. He tried the experiment, and was delighted to find his next child as beautiful as he could wish. Many instances are given of the influence of the mother's state of mind upon her unborn offspring, some of which we shall give farther on, and if we can rely upon them as proofs that the mental condition of the mother influences the mind of the child, may we not equally believe that her imagination will effect the child's physical development.

Also, this effect of post-conception intercourse may be produced in another way: The semen which the male casts into the female organs is, to a considerable extent, absorbed by the surrounding tissue, and it is highly probable that a portion of it is communicated to the blood supply of the fœtus. This being the case, it may well be that the absorption of a portion of this vital fluid of the father, or other male with whom such subsequent copulation is had, into the ovum with its contained embryo, imparts some characteristics of that male to the developing embryo.

Intellectual Influence of the Mother During Pregnancy. It is well known to breeders of dogs that the pups of a well-trained bitch, who is exercising her *quasi* intellectual faculties very largely during the period of gestation, in learning and understanding her duties as required by her master, not only are unusually intelligent, but learn almost without any instruction the particular arts and tricks practiced by their dam during that period. Numerous cases are cited to show that the same rule holds good in the human subject.

Fowler says that while the *physical* condition and habits of the mother during the first five or six months are reflected in the physical condition of the child, that being the period when the base of the brain is formed, which supplies the nervous force for the physical system, that it is during the last three or four months

that its character is given to the upper portion of the brain, the seat of the intellectual faculties. "Hence," says he, "during the first portion of gestation mothers should take much exercise, and keep up a full supply of physical vigor; but after the fifth or sixth month, while the *top* of the child's brain is forming, they should study much, and exercise their *Moral* faculties most."

The fœtal history of some remarkable men, as Flaxman, the artist, Zerah Coburn, the mathematical prodigy, and others, shows clearly the capacity of the fœtus to benefit by its mother's intellectual activities. From his earliest childhood, Flaxman showed a delight in drawing, and the outlines drawn by him are by many considered the most graceful in existence. His mother was a woman of refined and artistic tastes, and for the last few months of her pregnancy with this child, she spent hours daily in studying engravings, and fixing in her mind the most beautiful proportions of the human figure as pictured by the masters.

Zerah Coburn's mother was a weaver of figured cloths, and often, to fill orders, she had to invent new designs, the working out of which involved intricate and careful computation of the number of stitches, etc., required. One figure which she undertook gave her a great deal of trouble. She studied upon it for several days, and even lay awake nights trying to solve the problem. One night she saw that so many threads woven thus, and so many more thus, would bring the desired figure, and in the morning she worked it out on her loom. About two months later she gave birth to this mathematical wonder, her son Zerah. His powers of computation were first noticed at three years of age, when he was often noticed standing, and saying to himself, that "so many of this and so many of that made so many of the other," and the like.

A case is related by Fowler of a Mr. and Mrs. S., who were both deficient in arithmetical powers. But the necessities of certain circumstances led to the wife's taking upon herself the care of her husband's business, and, though with extraordinary exertion of intellect on her part, she carried it on successfully. Yet her daughter and son, born during this period, are both splendid natural mathematicians.

There is no doubt, on the other hand, that habits the converse of these in the mother—frivolity, irritability, anger, jealousy,

avarice, and other evils, stamp themselves indelibly on the character of the unborn child.

Of all education, then, that imparted by the mental condition of the mother, during the later months of pregnancy, is not only the earliest, but infinitely the most important, for upon that largely depends the mental and moral traits, dispositions and powers of the child, the intellectual and spiritual machinery with which it is equipped and started on the journey of life. The saying, "All men are born free and equal, education does the rest." will arrive nearer the truth if it be understood that that education begins in the mother's womb.

CHAPTER XVIII.

CHILDBIRTH:

PARTURITION, DELIVERY, CONFINEMENT, ACCOUCHMENT.

IT is often very desirable to know when the childbirth may be expected, so that all necessary preparations may be brought down to date, such as notifying the physician afresh, preparing the bed, etc., etc.

One of the *earliest symptoms* may be observed about two weeks before confinement. It is a subsidence of the womb, the highest point of the womb coming down from a point above the navel to below it, and the abdomen appears smaller. This subsidence of the womb relieves the stomach and lungs from pressure, and the woman feels much more comfortable. It is well to bear in mind that this sense of lightness, buoyancy and relief is a sign of approaching parturition, for by neglect of it women have undertaken extraordinary work, or journeys from home, and have been "caught" by labor while away from home, or on the street, or while in a store on some shopping expedition.

A second early sign of approaching labor, is an increased fulness at the vulva, or external genital organs. Also the mucous secretion from the parts becomes more profuse, even to the extent of requiring a napkin to be worn. This is a good symptom, as it indicates that the parts are much relaxed, and an easy delivery is probable.

A change in the mental condition of the woman usually is what may be called the third preliminary sign. She becomes anxious and fidgety, and often quite depressed in spirits. This is apt to continue until the signs arrive of actual labor.

The first sign of actual labor is usually the discharge of the plug of mucous, which has occupied the neck of the womb from the beginning of pregnancy, and this discharge is usually accompanied by a little blood. This is called the "show." A little before, or perhaps not for some hours afterwards, the *labor pains* begin. *True* labor pains may be distinguished from the *false* by their location and character. The true labor pains are described

"grinding" in their character. Also they are intermittent, occurring at intervals, alternating with periods of ease, while the false pains are pretty much continuous. *True* labor pains are felt in the lower part of the back, passing down to the thighs, while the false pains appear to be in the abdomen. The labor pains are comparatively slight at first, and at intervals of half an hour, or an hour; but as labor progresses they become more frequent and severe.

Other signs that labor has actually begun are nausea and vomiting (a good sign in the early part of the labor), and a frequent desire to empty the bowels and bladder. Indeed this latter has led to the actual childbirth taking place in the privy closet, to which the woman had gone to relieve herself. Shivering, without any sensation of cold, is another symptom, and finally the rupture of the sac containing the *liquor amnii*, commonly called the "bag of waters."

The ancient theory was that the child caused, or at least assisted in, its own escape from the womb, and even so late as the eighteenth century, it was held by a no less distinguished person than the Naturalist, Buffon (1707-1788). Some contended that the desire of food, or of air, caused the infant to struggle for its freedom. But the fact that a fœtus some time dead is expelled in exactly the same way, destroys at once all these ingenious theories. The fact is, that the child is expelled chiefly by the contraction of the muscular walls of the womb, usually assisted somewhat by the muscles of the abdomen and of the diaphragm. The cause of labor is in the womb itself, though just what nervous impulse sets its muscles into action is not known. Childbirth, it is said, has even occurred after the *death* of the mother, and a case is recorded in which labor began and twins were born three days after the mother's death. Whether these twins were born alive or not is not stated, and the whole thing points rather to a case of suspended animation than of real death.

Children have been brought forth alive after the mother's death by a Cæsarean operation, cutting open the abdomen and the womb and bringing the child forth in that manner. This operation received its present name from the fact that the Roman statesman and warrior, Julius Cæsar, was brought into the world in that fashion. The word is derived from the Latin, *cædere* (cæsum), to cut. To this extraordinary entrance does Macduff refer (Shak.—Macbeth, Act V., Scene VII.).

"*Macbeth.* I bear a charmed life, which must not yield
To one of woman born.
Macduff. Despair thy charm;
And let the angel whom thou still hast served
Tell thee, Macduff was from his mother's womb
Untimely ripped."

In childbirth the top of the head is the part which usually first sees the light, as appears in the plate at the end of this chapter. When the child is presented for expulsion in some other way, the physician sometimes finds it necessary to take advantage of the period of rest between the labor throes to insert his hand, thrust the child back, and turn it into a more favorable position.

It is now a very common and very excellent practice to administer a little chloroform in the later and severer stages of delivery, thereby making the pain much more endurable and relaxing the external parts, while not interfering at all with the vigor of the uterine contractions. Also, the skilful obstetrician will sometimes materially assist in the delivery by seizing the infant with large forceps, designed for the purpose, and pulling it with more or less force from the womb.

The child at birth is connected still with the mother by the umbilical cord, or navel-string. This is duly cut by the physician or nurse, proper ligatures being first put on to prevent bleeding, and the child is a separate being.

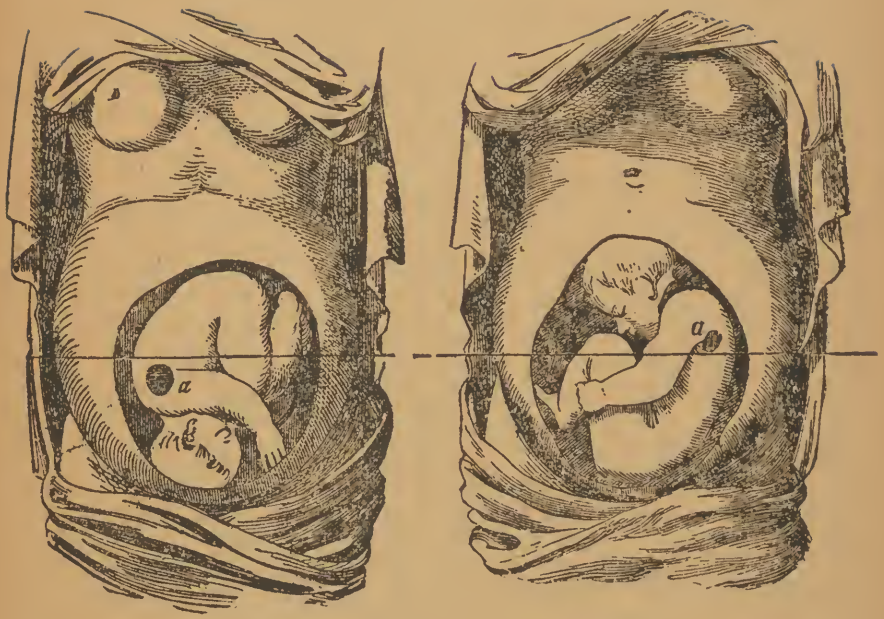
The Mortality of Childbed varies, other things being equal, with the number of the pregnancy, the age of the woman, the sex of the child, and the duration of the labor.

First confinements, and childbed fever following them, are about twice as likely to result in the death of the mother as later ones, but after the ninth labor, the danger increases with each successive confinement.

The age of least mortality is about twenty-five years. Before and after that age, the risk is increasingly greater. Especially is this the case with those under twenty years of age; and Aristotle's observation, that "to the female sex premature wedlock is peculiarly dangerous, since, in consequence of anticipating the demands of nature, many of them suffer greatly in childbirth, and many of them die," is abundantly proven true by modern statistics. As first labors are the most hazardous, and as the period between twenty and twenty-five is the safest for childbirth, that

PLATE XVII.

Fig. 1. Fig. 2.



POSITIONS OF CHILD IN WOMB AT TERM.

Fig. 1. The *head* presentation—the most usual. The next most usual presentation is the same, but with the back towards the mother's *left* side.

Fig. 2. A *breech* presentation—the next most usual.

The dark spot marks the place where the sound of the foetal heart may be heard.

period would appear to be thus marked out as the most proper one for matrimony.

The head of the fœtus is the largest part of it; and as the head of the male child is, on the average, larger than that of the female, and the bones are harder and less easily squeezed together, it naturally follows that the birth of males is more dangerous to their mother than that of females; and statistics prove this true.

The mortality also increases with the duration of labor. The longer the terrible strain of labor continues the more unlikely the woman is to survive it. But this is only one of many causes, and by no means the chief, of mortality in child-bed.

The duration of labor varies, it may be said, from two to eighteen hours, though cases have been known in which it was protracted to an even greater length. First confinements, generally, are longer than later ones; and those of male children, Dr. Collins, of the Dublin Lying-in Hospital, says, average one hour and four minutes longer than those of female children. He also found tha tchildren weighing over eight pounds, averaged four hours and eight minutes longer than those which weighed less than that amount.

The facts above-mentioned account for the circumstance that there are more male than female children *still-born.*

CHAPTER XIX.

TWINS, TRIPLETS, ETC., SUPERFŒTATION, EXTRA-UTERINE PREGNANCY AND OTHER UNUSUAL CONCEPTIONS.

MANY writers consider twins, triplets, etc., as abnormalties, and declare that plural births are not to be classified as natural forms of pregnancy. Dr. Arthur Mitchell brings forward statistics to prove that idiocy, imbecility and bodily deformity occur with much greater frequency in twins than in single-born children. But while it is undoubtedly true that triplets and quadruplets must be classed as unnatural conceptions, not only from the rarity of their occurrence, but from the enormously high percentage of still-births, or of death soon after birth in such cases, but from the fact that normally the ovaries ripen each but one egg at a time.

On the other hand, it seems a quite natural thing that ovulation should occur in both ovaries at once, and that both eggs so matured should be impregnated. The "heads and points" position in which twins invariably occur in the womb (see the plate at the beginning of this chapter) indicates, by its regularity, that it is of design, not accident. Moreover, the observation of most people will, we fancy, scarcely coincide with that of Dr. Mitchell in assigning any greater likelihood or frequency of bodily or mental deformity to twins than to other children.

The disposition to plural births is often found to run in families. Curngeven mentions a woman who had four twin pregnancies; her mother and aunt each had one, and her grandmother two. Simpson tells of a case of quadruplets, all of whom, three boys and a girl, survived, and the girl lived to become herself the mother of triplets.

The first birth is much more rarely plural than any subsequent ones, and it is said that in the case of first pregnancies, the older the mother the more likely she is to bear twins. The author has in mind, however, two cases of plural first pregnancies, in both of which the mother was under thirty years of age, and in one only twenty-five.

PLATE XVIII.

USUAL POSITION OF TWINS IN THE WOMB.

The frequency of plural pregnancies in various countries of Europe is given in Puech's Table of Multiple Births, as follows:

Countries.	Proportion of Twin to Single Births.	Proportion of Triplets.	Proportion of Quadruplets.
England	1 in 116	1 in 6,720	.....
Austria	1 " 94	.....	.....
Baden	1 " 89	1 " 6,575	.....
Scotland	1 " 95	.....	.....
France	1 " 99	1 " 8,256	1 in 2,074,306
Ireland	1 " 64	1 " 4,995	1 " 167 296
Mecklenburg-Schwerin	1 " 68.9	1 " 6,436	1 " 183,236
Norway	1 " 81.62	1 " 5,442	.....
Prussia	1 " 89	1 " 7,820	1 " 394.690
Russia	1 " 50.05	1 " 4,054	.....
Saxony	1 " 79	1 " 1,000	1 " 400 000
Switzerland	1 " 102	.....	.....
Wurtemburg	1 " 86.2	1 " 6,464	1 " 110,991
Average	1 " 81	1 " 5,775	1 " 555 086

But leaving out France the average of quadruplets in the countries named, so far as the table goes, would be 1 in 251,243. Russia, it will be noticed, produces the largest proportion of twin births, and England the smallest; Saxony, the largest proportion of triplets; and, so far as the tables show, France the smallest, while in quadruplets Wurtemburg stands highest, and France by far the lowest. The diminishing population of France is not, however, due to the proportionate infrequency of multiple births, but to the low general birth rate. This low birth rate is owing, doubtless, to the extensive practice of keeping mistresses instead of wives, which extends from the highest ranks of society to the lowest, and is quite open and unblushing, and to the equally unblushing and still more prevalent use of means for the prevention of conception and avoidance of offspring

In most cases twins are male and female, next most common are twin females. Simpson calculates that in fifty-nine thousand one hundred and seventy-eight labors, cases of male and female twins occurred once in one hundred and ninety-nine labors, twin females once in two hundred and twenty-six, and twin males once in two hundred and fifty-eight. Cases of quintuple pregnancy are recorded, but the pregnancies miscarried. The chances of

safe delivery and survival of twins, triplets, etc., are much less than those of children born singly, the mortality in twins being about one in thirteen, while that in triplets and quadruplets is very much greater. Twins and triplets are nearly always somewhat less fully developed at birth and smaller than single children, the weight of the two or three seldom exceeding ten or eleven pounds, while in the case of quadruplets the birth is usually so premature that they cannot survive. The birth of *five* living children at a time is very exceptional, and is nearly always fatal to the offspring. Indeed they seldom, if ever, arrive at full term. The following cases are mentioned by Napheys:

"A woman aged thirty, the wife of a laborer and the mother of six children, was taken in labor about the seventh month of her pregnancy. Five children, and all alive, were given birth to—three boys and two girls. Four of the children survived an hour, and died within a few moments of each other. The fifth, a female and the last born, lived six hours, and was so vigorous that, notwithstanding its diminutive size, hopes were entertained of its surviving. Another case is reported in a French Medical Journal. The woman was forty years old. She had had twins once and single children five times. On her seventh pregnancy when five months gone, she was as large as women usually are at the end of their full term. At the close of the fifth month she was delivered of five children. They were all born alive, and lived from four to seven minutes. All the children were males, well built and as well developed as fœtuses of five and a half months usually are in a single birth. The woman made a good recovery."

Statements are found in some books of seven, eight, nine, ten and even more children at a birth, but such litters may fairly be taken as the product, not of the womb, but of the writer's imagination. Of this class of product certainly must those be mentioned by a traveller named Groftr. "This writer states that he saw in a church at Lansdown, about five miles from the Hague, in Holland, in 1630, an inscription stating that a certain Countess, whose name and family he records, brought forth at one birth, in the fortieth year of her age, in the year 1276, no less than three hundred and sixty-five infants. They were all baptized by Guido, the Suffragan, the males being all called John and the females Elizabeth. They all, with their mother, died on the same day, and were buried in the above-mentioned church. This monstrous

birth was said to have been caused by the sin of the Countess in insulting a poor woman with twins in her arms, who prayed that her insulter might have at one birth the same number of children as there were days in the year." The imagination of the traveller, or else of the pious clerk who inscribed the tablet, must have been very thickly peopled indeed.

It often happens, too, that twins are somewhat unequally developed. This may be either because one was actually conceived later than the other, or that one has been retarded in its development.

The cause of plural pregnancies is probably the development of two Graafian Vesicles and expulsion of two eggs at one time, either from one or from both ovaries. In some cases two ova thus expelled from the ovaries at or about the same time, become separately impregnated by separate acts of copulation, as is proven by the case of a negress bearing twins—one black and one mulatto. In some cases, too, a single Graafian Vesicle is found to contain two ova, both, or either, of which may be impregnated on expulsion. These may even adhere together after impregnation and develop fœtuses attached to each other, as in the well-known case of the Siamese Twins. A case of two ovules from one Graafian Cell often found is that of the double-yolked egg of the common barn-yard fowl.

In some cases twins are contained in the same sac of membranes, but usually in separate ones. And even where the outer sac, or *decidua reflexa*, is one, the inner ones, especially the amnions, or innermost sacs, are usually two and distinct. Generally there is but one placenta, the two umbilical cords either entering it together, or even uniting a few inches from it and continuing to it as one cord. Where there is only one Chorion, or second fœtal membrane, enveloping both twins, the twins are always of one sex.

In the case of triplets, one is generally contained in a sac by itself, while the other two, having been formed from a double ovule, or egg, are contained in one chorion, though in separate amnions.

It is very difficult to ascertain before birth whether or not there are twins. Sometimes the shape of the abdomen is quite irregular in the case of twins, there even appearing a hollow place between the two prominences; but the only sure test is by aus-

cultation, that is by listening for the sound of the fœtal heart. If two distinct heart-beats be heard, one on each side, with a place between where none can be heard, and especially if a difference in frequency exist, the existence of twins may be declared with certainty. But if, as is sometimes the case, one lies behind the other, the sound of its heart may be prevented by the body of the other from reaching the ear.

Superfœtation and Superfecundation. This is a very interesting subject, and one which, from the infrequency of the occurrence of cases, is seldom or never heard of by the layman.

By *Superfecundation* is meant the impregnation of a second ovule by a second copulation, within a very short time of the first, as in the case above mentioned, in which a negro woman was delivered of twins—one pure negro and the other half-caste—the result of successive sexual intercourse with a negro and a white man.

Superfœtation is the impregnation of a second ovule while the uterus already contains a fœtus in a considerable stage of advancement. Very many cases prove this beyond a doubt to be quite possible. In some of these cases the two are delivered at one time, but the one in a much less advanced stage of development than the other, and in others each is delivered in due order at full term, the labor which causes the birth of the earlier having no effect upon the other. In the cases of the latter sort, it is probable that the womb is bifid, or divided into two parts by a greater or less partition, and that the first pregnancy occurring in one part, that part only becomes filled and occupied by the ovum, leaving menstruation to go on and conception, upon later intercourse, to take place in the unoccupied lobe of the womb. Dr. Ross, of Brighton, mentions a remarkable case of this kind. A woman who had previously borne six healthy children at full term, became pregnant, and on July 16, 1870, miscarried of twins, and on October 31, fifteen weeks later, was delivered of a healthy child at term. In this case an examination of the uterus showed it to be completely double.

Dr. Bonnar, of Cupar, on consulting the records of the British Peerage, which are most carefully and accurately compiled, came across a number of interesting cases. In one case a mother gave birth to one child on September 12, 1849, and to another on January 24, 1850, only one hundred and twenty-seven

days after. As both these children survived, it is impossible that the second could have been conceived after the first was born, nor can the first have been a twin, born so long before its time, else it could not possibly have survived.

Some cases of miscarriage also have been observed by obstetricians in which embryos of different ages were cast off. For example: one shown by Harley and Tanner, at the Obstetrical Society, in 1862, in which ova of four or five and one month's development, respectively, were miscarried at one time. Tyler Smith also describes the case of a young married woman, pregnant for the first time, who miscarried at the end of the fifth month, and some hours afterwards a small clot was discharged, inclosing a perfectly healthy ovum of about one month. There was no sign of a double uterus in this case. The patient had menstruated regularly during the time she had been pregnant.

Dr. Regan says: "According to Aristotle a female was delivered of twelve infants, and another of twins, one of which resembled her husband, the other her lover. Nothing is more common than to see a full-grown infant born, and another of the second, third, fourth, fifth or sixth month expelled immediately after. I need not cite authorities upon this point, as obstetic works abound with examples. But a few examples may be given. Dr. Mason published an account of a woman who was delivered of a full-grown infant, and in three calendar months afterwards of another, apparently at full time. A woman was delivered at Strasburg, April 30, 1748, at ten o'clock in the morning; in a month afterwards M. Leriche discovered a second fœtus, and on September 16, at five o'clock in the morning, the woman was delivered of a healthy, full-grown infant. Dr. Granges, of Lyons, attests a case: the woman was delivered at the full time, January 20, 1780; in three weeks afterwards she felt the motions of an infant, and her husband had no intercourse with her for twenty-four days after delivery. On July 6, five months and sixteen days subsequent to delivery, she brought forward a second daughter, perfect and healthy. On January 19, 1781, she presented herself and both infants before the notaries at Lyons to authenticate the fact.

One of the Pennsylvania newspapers, in 1827, recorded the case of an Irish lady, who, in eighteen months, had, at three births, twelve living children, all born prematurely. She and her

husband were healthy, fresh-looking people, and only two years married. This case is not recorded as yet in any of the American Medical Journals, and, if it prove to be authentic, it will be the most extraordinary case of fecundity recorded in any country. Dr. Golding delivered a woman of six infants during the year 1829.

The fact that the woman mentioned on page 215 had menstruated regularly is important as showing that ovulation may go on, for a time at least, even during pregnancy; and as it is well known that the ovum does not fill the uterine cavity so as to cause the *decidua vera* and *decidua reflexa* to blend together, and thus effectually shut out the spermatozoa from the fundus of the womb and from the Fallopian Tube, until the third month of pregnancy, perhaps in some cases even later. Some physiologists contend that the plug of mucous, which fills the neck of the womb almost from the beginning of pregnancy, is in itself sufficient to prevent the passage of the spermatozoa; but there is no doubt that this is quite insufficient to stop them, being no different in kind from that which ordinarily occupies the womb, and rather facilitates than impedes the movement of the Spermatozoa by giving them a medium to swim forward in.

Extra-Uterine Pregnancy. The only natural and proper place for a Fœtus to be formed is in the Uterus. Sometimes, however, it happens that it is formed in a Fallopian Tube, or in the Abdominal cavity near the ovary, or even in the ovary itself. These three unnatural pregnancies are called, respectively, Tubal, Abdominal and Ovarian pregnancies. The causes of these abnormal conditions are disputed; and the dispute hinges partly on the question where impregnation of the ovum takes place, in the womb, or in or beyond the Fallopian Tubes. Those who hold that impregnation always takes place in the womb, or in the very end of the Tube next to the womb, maintain that even in the case of extra-uterine pregnancy the egg is fecundated in the very end of the Tube next the womb, and then some violent emotion, a fright for instance, reverses the action of the tube, and the egg is carried back the way it came. Two or three objections may be found to this theory; for example: the cilia, or little protuberances within the tube, point towards the womb, and would effectually prevent any object so large comparatively as the ovum from being carried back by the reversed peristaltic action of the muscles of the Tube; also it seems very unlikely that an ovum,

which occupied perhaps several days in passing down the tube with the aid of the natural motion of the cilia and muscles, should in a moment, by one spasmodic effort of reversed peristaltic action, be thrown completely back into the remote end of the tube, into the abdominal cavity, or even into the cavity of the Graafian Cell, from whence it came. Also there would seem no reason, when the fright is over, the natural action of the tube being restored, formed as it is to promote motion through it and not to arrest an object in it, why the ovum should not even then be returned to the womb.

The opinion now generally held is that the spermatozoa pass up the Fallopian Tube and impregnate the egg either in the larger and more remote end of the Tube, or on the very surface of the ovary itself, as the egg emerges from its cell. Such a spasm as mentioned occurring then might cause the Fimbriæ of the Tube to let go their hold and to allow the egg to drop into the abdominal cavity. There is little doubt that many ova are so dropped, but, either because they are not impregnated, or, being impregnated, fail to be able to attach themselves to the smooth and comparatively bloodless abdominal walls, they do not develop but are absorbed into the surrounding tissue. Various reasons may cause ovarian conception; the egg may in some way be attached to the lining of its Graafian Cell, and so is not expelled when the cell ruptures; but, adhering to the cell wall, it is there impregnated and there develops; or it may be allowed to slip back into the cell by the Fimbriæ of the Tube letting go their hold just as it is passing out. But it can hardly be conceived, bearing in mind that the tube does not open into the ovary, but into the abdominal cavity, its open end then being merely pressed against the ovary when a Graafian Vesicle is to be ruptured and an egg received into the tube, that once clear of the cell and safely in the tube, it should ever again find its way back to the little cell from which it with difficulty emerged, any more than that a new-born babe should, by some accident, be returned to its mother's womb.

Abdominal pregnancy probably results from the fimbriæ of the tube, by some accident as before described, letting go the ovary before the egg is well on its way down the tube, and the egg, being impregnated either before it left the tube, or after it dropped into the abdominal cavity, where frequently spermatozoa make their way, attaches itself to some of the tissue of the abdomen and then develops.

Tubal pregnancy is probably caused either from some constriction in the Tube, which prevents the egg from passing readily through, or perhaps in some cases by the motor nerves of the tube becoming paralyzed by some violent emotion, as fear, anger, etc. The ovum, being as yet independent of the nervous system of the mother, does not feel the shock of such emotion, but failing to be carried to its proper destination, the womb, it attaches itself where it is lodged, and develops there.

In some cases of Tubal pregnancy, the *Corpus luteum*, or scar on the ovary, showing where the ovum came out which is impregnated, is found on the *opposite* ovary. Various explanations are given of this extraordinary phenomenon. Playfair thinks that the Tube from the opposite side has twisted itself completely over to the ovulating ovary on the opposite side, embraced it with its Fimbriæ and received the expelled egg, then return to its usual place, and that the stoppage of the egg was due to the twist so made in the tube. This, however, seems almost too extraordinary for belief. Other obstetricians, whom he quotes, think that the egg has been passed down the Tube pertaining to the ovary, from which it came, and has been by some such convulsion, from fright or otherwise, as before mentioned, taken up into the opposite tube. It is quite possible, too, that there is a mistake in the premises, and that the *corpus luteum* found in the opposite ovary was not really that of the egg in question. There is a very wide variation in the development of these *corpora lutea*, and it does not pass belief that the real corpus luteum, marking the Graafian Cell from which the egg came, might have been found on the ovary on the same side as the Tubal pregnancy, though in a comparatively undeveloped condition.

Sometimes the ovum, having got safely to the womb, finds its way by some means within the substance of the muscular coating of the womb and there develops, surrounding itself with the much distended wall of one side of the womb.

Dangers of Extra-Uterine Pregnancies. These extra-uterine pregnancies are always attended with the greatest danger to the life of the mother. As for the fœtus, it seldom develops for more than three or four months in Tubal pregnancy until it bursts the tube and death ensues. If the swelling and its cause be discovered before this catastrophe occur, various operations are performed to prevent it, some of which are directed to the

destruction of the embryo, as by piercing the abdominal wall, the tube and the developing ovum within, and letting out the fluid contents of the ovisac, or injecting morphine to poison it, then leaving it to slough away down the tube into the womb; sometimes the abdominal wall is cut through and the Tube cut out and taken away with its contents. In case of ovarian and abdominal pregnancies, somewhat similar remedies are sometimes adopted. Some surgeons adopt the method, too, of inserting an Aspirator, or small needle-like syringe, and through this drawing off the fluid without making any larger puncture even in the skin of the abdomen. Sometimes a battery is connected and the embryo killed by electric shock If discovered at a period when it is so large that it cannot be safely killed, and left in the abdominal cavity to be absorbed, it is sometimes taken away by opening the abdomen and removing it with the knife, which, when it is firmly attached, is a very dangerous operation, or it is left till the fœtus arrives at full term, when the abdomen is cut open and the child taken away. This latter operation not only may save the life of the child, but is by many thought to be less dangerous to the life of the mother than an operation at an earlier stage.

Strange to say, in these cases of abdominal and ovarian pregnancy, the labor pains come on at term in the usual way, but of course without effect. If the fœtus be not removed they cease after a time, and it dies. After that, in some cases, it decays and, unless speedily removed, the mother will die of blood-poisoning; in other cases it gradually shrinks up until nearly absorbed; in still others it remains as large and fresh as ever for years without causing any injury to the health, cases having been known in which they were so carried for as high as nine and even thirteen years.

Multiparæ, that is women who have already borne a number of children, are more liable to these abnormal pregnancies than those with whom the pregnancy is the first; and a woman may suffer from them several times in succession, and then produce a child in the natural way. The usual result, however, is barrenness.

Hollick maintains that in every case in which the history of these extra-uterine pregnancies can be traced, it will be found that a fright or other accident occurred about the period of conception, and he believes this to support his opinion that the egg had been impregnated, then *carried back* into or through the tube. But

this is equally or more consistent with the theory we hold that in many of these cases a fright, or other nervous excitement, caused paralysis or stricture of the Tube, and prevented the ovum, already or afterwards impregnated, from at all passing down the tube. A singular fact mentioned by him is that most of such cases have arisen from *illicit* intercourse, the extraordinary and conflicting emotions attendant on such intercourse, extraordinary sexual excitement, coupled with the fear of present discovery or subsequent exposure, perhaps paralyzing the nerve supply of the Fallopian Tubes, or causing such strictures as are above described.

Intra-Fœtal Pregnancies. A still rarer and still more remarkable phenomenon is the existence of a fœtus within a fœtus. It appears that in some cases of double conception, both embryos are within the one amniotic sac; one remains for some time rudimentary, while the other goes on, develops, and surrounds or envelops the other, involving the impregnated but undeveloped ovum within its tissues. After a greater or less time, the contained ovum begins also to develop, and finds itself a fœtus within the body of its twin brother. Sometimes this development of the second ovum is postponed until the child is born, or even until some years later.

A correspondent of the *Dantzic Gazette* states that on Sunday, February 1, 1869, at Schliewen, near Dirschau, "a young and blooming shepherd's wife was delivered of a girl, otherwise sound, but having on the lower part of her back, between the hips, a swelling as big as two good-sized fists, through the walls of which a well-developed fœtus may be felt. Its limbs indicate a growth of from five to six months, and its movements are very lively. The father called in the Health Commissioner, Dr. Preuss, from Dirschau, and begged him to remove the swelling, together with the fœtus. The doctor, however, after a careful examination, declared that there was a possibility, in this extraordinary case, of the child within the swelling coming to fruition. Its existence and active motions were palpable to all present. No physician could be justified in destroying this marvellous being. It ought, rather, to be protected and cherished. The new-born girl, notwithstanding her strange burden, is of unusual strength and beauty, and takes the breast very cheerfully." The Health Commissioner, writing in the same paper, corroborates the statement of this remarkable case, as above given, and goes on

to say: "But what is novel, and hitherto unnoticed in Medical Literature, is the fact, that not only the girl, which has been carried its full term, is alive to-day, but the fœtus within the swelling has also, in the eleven days after birth, further developed, and palpably increased in size. The swelling is now four and a half inches long, three and a half inches wide, and high and pear-shaped; the head lies underneath on the left, the body towards the right."

It appears that later the child was brought before the Natural History Society, of Dantzic, at the Society's special request, and thence the mother went to Berlin for medical advice, but later particulars regarding this phenomenon are wanting.

The case of the boy Bissien, which occurred at Verneuil, in France, in 1804, is of the same sort. This child differed apparently nothing from other children, but always complained of something being the matter in his left side, where, indeed, a small tumor appeared when he was quite young. He, however, grew and developed in body and mind as usual, until he was thirteen years of age, when the tumor suddenly increased in size, and he began to pass from his body putrid matter, mixed with long hair. Fever set in and he died at about fourteen years of age; a post-mortem examination was held, and revealed, between the intestines and spine, the remains of a fœtus. From the appearance of the bones, teeth, nails and hair, the fœtus was not a mere infant, but had the tissue development suitable to the age of the brother, in whose body it lay so long.

Dr. Hollick says he has often met with such cases in dissecting animals, and that a friend of his once found such an inclosed fœtus in the body of a man at thirty, which was so perfect that he could distinguish it as of the male sex.

Monstrosities. These peculiar births, called also *Lusus Naturæ*, or Freaks of Nature, are of various sorts. Some have more parts than natural, as two thumbs on each hand, six toes on each foot, or even two heads. Some appear to be two persons as far as to the waist, and thence downward, one. Various other such superfluities appear. On the other hand, some of the parts may be wanting, as one or both arms, or legs, or even the *head* may be absent. The eyes or the organs of hearing may be absent or undeveloped, and various other deficiencies appear. Or, thirdly, some of the parts may be unnatural; as the spine may be curved, or the

hands may be joined to the shoulders at the wrists, or the legs may be unnaturally short, or the head too large for the body, or the like. The brain may be deficient or wanting in the upper part, and then the child is idiotic. Various peculiar marks may appear on different parts of the body. Cleft palates and hare-lips are quite common. These seem to be cases of simple arrested development.

These freaks of Nature cannot be certainly accounted for. It is by many believed that they are caused by various states of the mother's mind during pregnancy, as longings and cravings, frights, impression, and the like, but the evidence in support of this theory is, as pointed out in the article on "Mother's Marks," far from satisfactory.

Dr. Playfair suggests that the absence of a limb may be caused by something getting twisted round it in an early stage of fœtal existence, causing it to atrophy and fall off; some suggest that the umbilical cord may produce this amputation. But it is a singular fact, that when one arm is apparently in this cut-off condition, the other has been a like sufferer. Cases have been found of the amputation of an arm within the womb in so late a stage of pregnancy that the arm still existed, and was brought forth with the fœtus to which it belonged.

These deformities may originate in some defect in the ovum of the mother, or in the seminal animalcula of the father. Dr. Hollick mentions the case of a man whom he knew who had three deformed children by one wife and two by another, owing to imperfect Animalculæ, as he proved by observing samples of the semen with a microscope. And it seems probable that many cases of deformity arise from this unsuspected cause, and the mother looks round to recollect some circumstance occurring during pregnancy to account for the monstrosity.

Hermaphrodism. A hermaphrodite is a being whose genital organs are bi-sexual, which partake of the character of both the male and female organs. Probably no true hermaphrodite exists in the human race, but there are, undoubtedly, many persons who are apparently such, and whose sex can hardly be ascertained except by the most careful examination.

The name, Hermaphrodite, leads us back to the age of mythology. Its origin is variously stated. One legend is that Hermaphroditus was a son of the goddess Venus, by the god Mercury; that he was educated by the Naiades dwelling on Mount

Ida, on the Asiatic coast of the Ægean Sea At the age of fifteen years be began his travels. He was an extremely handsome youth; and one day, as he rested in the shade by a cool fountain, near Caira, he was seen by Talmakis, the presiding Nymph of the fountain. Becoming enamored of his beauty she approached him and endeavored to seduce him, as Venus, his mother, had tried to seduce Adonis, and with like failure. Hermaphroditus was a pattern of continence and withstood her wiles, as did Joseph those of Potiphar's wife. Talmakis then seized the youth, embraced him, and prayed to the gods to combine and amalgamate their two bodies in one. Her prayer was granted by the gods on Mount Olympus, and the two became one, but the composite body retained the sexual characteristics of both. This monstrosity then conceived by itself, and originated a race of like kind, the fabled race of the *Androgynes* (Greek—*aner*, male, and *gyne*, woman).

Another tradition, and probably the correct one, is as follows: Carnia, or Halicarnassus (Karnassus-by-the-Sea), was a famous watering place of Asia Minor. To this seaside resort went the victims of gluttony, debauchery, and general physical bankruptcy to take the baths. The attendants at these baths were a lot of young and handsome eunuchs, who not only waited on the old, shattered, debauched wrecks of humanity who repaired thither, but prostituted their bodies to the vile and unnatural passions of their patrons, in the practice of pederasty. The nymph who presided over the mineral springs at this resort was called, from the salty nature of the waters, Talmakis, and was worshipped as Aphrodite, otherwise called Venus, the Goddess of Love, or Sexual Passion. Cities in those days chose or had some god or goddess, under whose especial care the city was supposed to be, just as in later days countries have their patron saints; for instance, as St. George is the patron saint of England, St. Andrew of Scotland, St. Patrick of Ireland, and St. Nicholas of Russia. The patron god of Halicarnassus was Hermes, corresponding to the Roman *Mercury*, and the patron goddess Aphrodite, corresponding to the Roman *Venus*. These eunuchs then were looked upon as the servants or minions of Hermes and Aphrodite, and were called Hermaphrodites; and from their practicing pederasty, as above-mentioned, any bi-sexual creature came to be called Hermaphrodite. Powell, in his history of the Omahas, a tribe of American

Indians, says that this vile practice, pederasty, was common amongst them, as indeed it was amongst many tribes of the south and south-west, and that they called the passive agent in it *min-quga* (man-woman), or hermaphrodite.

Though the great numbers of people who, in ancient times, or even in the middle ages, were called hermaphrodites, were, doubtless, merely men prostituted to feminine purposes, and wearing feminine garments, as they invariably did, yet there are, at the present day, occasionally found persons in whom it is difficult to distinguish the sex, and courts of law have been called upon to decide the question of sex in order to adjudge concerning the validity of a marriage, and for other purposes.

As to the question, whether true hermaphrodism ever exists, it is a matter still of controversy. There seems no reason why, when all the other parts of the body are subject to faulty formations, the sexual organs should alone be exempt. And observation shows that many monstrosities and deformities of these organs are found, as well as of the others. But a variation from the normal to such an extent as to couple, as it were, parts of two persons, goes beyond ordinary deformity. It is true that humanity begins its existence in a state of what is called hermaphrodism; that is to say, the earlier development of the human embryo in the womb is along lines which are common to both sexes, and up to the second month male and female cannot be distinguished. At the same time there can be no doubt that there is a difference in the organs from the very day of their formation, though men have not yet been able to see it. This is so in all the higher animals where hermaphrodites do not normally exist. The egg of the common hen is in process of incubation for four days before the sex of the genital gland can be distinguished for the rudiment of an ovary or of a testicle. This can only be observed in the embryo of the rabbit on the fifteenth day, and in the human embryo on the thirtieth day. But this is a case of undistinguishable sex, not of double sex. As there are, however, cases in which two embryos have so grown together that at birth they formed two from the waist up, and one from the waist down, there appear no reason why creatures so conjoined should not be of the two sexes, and the lower half accordingly showing hermaphrodism. And even in those persons otherwise perfect, but in life apparently hermaphrodite, it nearly always happens that a post-mortem examination

shows them unquestionably of one sex or the other, and not of both.

Even in life, if the person attain the age of puberty, even when no vagina or uterus can be observed, the Monthly sickness usually appears in some form or other. Of course if the ovaries are wanting, or remain merely rudimentary, no menstrual function will appear.

A few of the cases of hermaphroditism may prove of interest. The paper published in 1886 in the *Archives of Criminal Anthropology*, of Lyons, France, by Dr. Debierre of that city, entitled, "Hermaphrodism Before the Civil Code; its Nature, Origin and Social Consequences," contains a curious list. The following are some of the cases recited by him:

A person named Marie Dorothee was examined by five physicians as to her sex. Of these Hufeland and Marsina pronounced her a woman, Stark and Martens declared her to be a man, while Metzger confessed his inability to decide the sex.

A person named Valmont had a penis; a scrotum but no testicles; ovaries and Fallopian Tubes; a womb, and a short vagina. The vagina was only about two inches in length; it gradually narrowed till it ended in the male urethra, with a regular prostate gland. This person, supposing herself a man, married a woman, and it was only on a post-mortem examination that she was proven to be a woman.

Dr. Trexel, of Kremsir, in Moravia, Austria, reported a case in *L'Union Medicale* for August 26, 1856, which is referred to in the *British and Foreign Medico-Chirurgical Review*, Volume XVIII. (1856), as follows:

On April 1, 1856, a new-born infant was brought to Dr. Trexel that he might determine its sex. The father and mother were servants of a peasant. On an examination of the alleged father, he was found to have all the external characteristics of a male; the penis, which was rather shorter than ordinary, but of large size, was imperforate; the scrotum was divided into two pouches, each containing a testicle. The apposed surfaces of the scrotal pouches were covered with a red skin, and the division extended throughout their entire length. At the root of the penis, in the anterior angle of these pouches, was an opening of the size of a lentil; this was the orifice of the urethra. The lower surface of the penis was grooved from the above-mentioned orifice to the end of the glands. There was no prepuce. Almost in a line behind the corona of the glands, and in the groove, were two

eliptical openings, which readily admitted a large hog bristle; there was a third smaller opening, two lines from the orifice of the urethra. This man had always passed for a woman. He lay in the same room with the mother of the child, and they acknowledged having had frequent connection. The woman declared that she had no commerce with any other man for three years, and the man did not deny this assertion. The idea of cohabitation with another man was further negatived by the circumstance that the infant had the same conformation of the genital organs as the father. How did fecundation take place? The three openings in the penis were probably the orifices of the excretory ducts of Cowper's glands. But might not these have been the openings of the ejaculatory ducts? It is to be regretted that Dr. Trexel did not examine these canals. Their length and direction would have thrown light on the subject. The fact of fecundation may also be explained by supposing that during coition the posterior wall of the vagina supplied the place of the absent floor of the urethra, thus forming a complete canal. This is the most probable explanation."

A very remarkable case was that of Hohmann, who died in Vienna, Austria, in 1869, at the age of forty years. It is reported by Rohitansky and also Ceccherelli. Hohmann had two ovaries, with their Fallopian Tubes; a uterus which was rudimentary; one testicle, with a vas deferens containing spermatozoa; and menstruated regularly, presumably maturing perfect ova in those ovaries, until the age of thirty-eight. Had the uterus been developed instead of rudimentary, we may well suppose that the semen might have been brought into contact with the ova, and a regular pregnancy produced, the woman becoming pregnant by her own male parts.

The case of Mathieu Perret, who died at the Hotel Dieu in Lyons, aged sixty-three, is very similar to that of Hohmann. These individuals could act the part of either man or woman in sexual intercourse, and are by some considered examples of true hermaphrodism.

Crecchio, in 1865, reported the case of Joseph, or Josephine Marzo. This person had a hypospadic penis, that is, having the urethra opening on its under side instead of at the end The penis was about four inches in length. There was also a prostate gland. She had a vagina about two and a half inches in length,

and one and a half inches in circumference, womb, Fallopian tubes and ovaries. She died at the age of fifty-six years, and was then, for the first time, ascertained to be a female.

Michel-Ann Dronart was a case of doubtful sex. Two eminent physicians declared this person a female, one a male, one was doubtful as to the sex, and one, the Danish Surgeon, Kruger, pronounced it asexual or without sex.

Debierre mentions also the remarkable case of Marie-Madeline Lefort. Sexually, this person was a perfect woman with ovaries, oviducts, uterus, vagina, etc., complete, and menstruated regularly. But the vagina was narrow at its lower end, and the urethra, instead of opening in the vestibulum, between the *labia majora*, opened into the vagina. The clitoris also was so greatly enlarged as to be mistaken for a penis. Her head, however, was that of a man, in shape and appearance, and she had a full, manly beard. The breasts were well developed as those of a woman are, but the chest was hairy, as a man's is often found to be.

Duval, in his work on "Hermaphrodites," mentions a case in which a man applied for a divorce, on the ground that his wife had a penis, which interfered to successfully prevent copulation. On examination by order of the court, it was found that the clitoris was so greatly enlarged that, when erected, it would undoubtedly interfere as the man had stated. The court accordingly decreed that, unless the young woman would have the objectionable member amputated, the divorce should be granted. She refused, and the decree went for divorce.

This abnormally large clitoris has often caused the sex of a female child to be mistaken by her parents, who have accordingly bred her to masculine employments. No doubt in some of these cases the true sex is never discovered, or even suspected, until death, or not even then. But in some cases their sins have found them out, as happened to the Hungarian soldier mentioned by Montaigne, who bore a child while in camp; and the monk referred to by the same writer, who went through a similar remarkable experience in the cell of his monastry; and the priest mentioned by Duval, who was imprisoned for pregnancy, by order of the ecclesiastical court.

On the other hand, though much more rarely, males have been mistaken for females. These are usually cases in which the

penis is merely rudimentary, and the testicles have not descended into the scrotum, as was the case with Marie Goulich, reported by Ladowsky, of Rheims. This man was believed to be a female until, at the age of thirty-three, his testicles descended.

Giraud's case was a remarkable one. This person was married to a man, and nothing was suspected of his being other than a woman until after the husband's death. He had no other female organ than a vagina, leading nowhere, but apparently pleasing the husband well enough.

Where these persons, having such deformities of the genital organs, produce offspring, the children are very apt to be likewise deformed. The case of the Austrian peasant's servant, cited above, is an illustration of this law of heredity. Hypospadia, that is, that malformation in which the urethra, or urinary passage, opens in the lower side of the penis, instead of in its end, is apparently especially transmissible. Dr. Lesser states that he treated eight such cases in one family in one generation.

In some of these cases the opening of the urethra is far enough forward to allow the semen, as it is ejaculated, to come within the vagina, and in such cases the spermatozoa may find their way to the ovum and pregnancy ensue. A case is mentioned in the *Dictionaire des Sciences Medicales*, in Volume XXXI., in which a person so deformed, and who could not, by means of the penis, even convey the semen into the vagina, nevertheless successfully induced pregnancy in his wife by receiving the semen in a warm spoon, and with that placing it within. And in other cases, as appears by Dr. Hollick's work on "Generation," the semen has been caught in a syringe, and with that injected.

In times of superstition, hermaphrodites, like other prodigies, were liable to become victims of the fear which public calamity inspired. The Roman historian, Livy, states that, during the fear and excitement of the Punic wars, the existence of a hermaphrodite was denounced as a cause of the disasters which befel the Roman arms; and, on the recommendation of the Etruscan soothsayers, that he should be first removed from Roman dominions and then drowned in the depths of the sea, this unfortunate was placed in a chest, put on board a galley, taken out to sea beyond sight of land, and thrown overboard. A similar fate befel an Umbrian hermaphrodite in the Consulship of Messalus, and of a Lunan during that of L. Metellus.

CHAPTER XX.

THE AVOIDANCE OF OFFSPRING.

THE problem which confronted Mr. Ginx, the father of Ginx's Baby, who was the hero of Mr. Jenkins' celebrated satire, stares many persons in the face. To quote from the opening chapter of "Ginx's Baby":

"The name of the father of Ginx's Baby was Ginx. By a not unexceptional coincidence, its mother was Mrs. Ginx. The gender of Ginx's Baby was Masculine.

"On the day when our hero was born, Mr. and Mrs. Ginx were living at Number Five Rosemary Street, in the City of Westminster. The being then and there brought into the world was not the only human entity to which the title of 'Ginx's Baby' was or had been appropriate. Ginx had been married to Betsy Hicks on the twenty-fifth day of October, 18—, as appears from the 'marriage lines' retained by Betsy Ginx, and carefully collated by me with the original register. Our hero was their thirteenth child. Patient enquiry has enabled me to verify the following history of their propagations. On July the twenty-fifth, the year after their marriage, Mrs. Ginx was safely delivered of a girl. No announcement of this appeared in the newspapers. On the tenth of April following, the whole neighborhood, including Great Smith Street, Marsham Street, Great and Little Peter Streets, Regent Street, Horseferry Road and Strutton Ground, were convulsed by the report that a woman named Ginx had given birth to 'a triplet,' consisting of two girls and a boy. The news penetrated to the Dean's Yard and the ancient School of Westminster. The Dean, who accepted nothing on trust, sent to verify the report, his messenger bearing a bundle of baby clothes from the Dean's wife, who thought that the mother could scarcely have provided for so large an addition to her family. The school boys, on their way to the play-ground at Vincent Square, slyly diverged to have a look at the curiosity, paying sixpence a head to Mrs. Ginx's friend and crony, Mrs. Spittal, who pocketed the money and said nothing about it to the sick woman. *This* birth was announced in all the newspapers throughout the kingdom

with the further news that Her Majesty the Queen had been graciously pleased to forward to Mrs. Ginx the sum of three pounds.

"What could have possessed the woman I can't say, but about a twelvemonth after, Mrs. Ginx, with the assistance of two doctors, hastily fetched from the hospital by her frightened husband, nearly perished in a fresh effort of maternity. This time two sons and two daughters fell to the lot of the happy pair. Her Majesty sent four pounds. But whatever peace there was at home, broils disturbed the street. The neighbors, who had sent for the police on the occasion, were angered by a notoriety which was becoming uncomfortable to them, and began to testify their feelings in various rough ways. Ginx removed his family to Rosemary Street. Up to a year before the time when Ginx's Baby was born, his wife had continued to add to her offspring until the tale reached one dozen. It was then that Ginx affectionately but firmly begged that his wife would consider her family ways, since, in all conscience, he had fairly earned the blessedness of the man who 'hath his quiver full of them'; and frankly gave her notice that, as his utmost efforts could scarcely maintain their existing family, if she ventured to present him with any more, either single, or twins, or triplets, or otherwise, he would most assuredly drown him, or her, or them in the water-tub, and take the consequences.

. . . . . .

"Convinced that another infant straw would break his back, Ginx calmly proposed to disconcert physical, moral and legal relations by drowning the straw. Mrs. Ginx, clinging to Number Twelve, listened aghast. If a mother can forget her sucking child she was not that mother. The stream of her affections, though divided into twelve rills, would not have been exhausted in twenty-four, and her soul, forecasting its sorrows, yearned after that nonentity, Number Thirteen. She pictured to herself the hapless strangeling borne away from her bosom by those strong arms, and—in fact she sobbed so that Ginx grew ashamed, and sought to comfort her by the suggestion that she could not have any more. But she knew better."

Poor hard-worked, ill-paid, laboring-man Ginx had never heard of Malthus, or of his doctrine, that the world was likely to become over-peopled if some check were not imposed upon pro

duction, and that the people then, not finding enough food to maintain a good standard of physical life, would starve each other, and the race would degenerate accordingly. He did not know that anyone by that or any other name had argued that wars were mankind's benefactions instead of calamities, as they tended to postpone the evil day when the mouths to feed would exceed the food supply; but Ginx, in his little world of thirteen children and two grown people, in his rude and ignorant way, had come to a similar conclusion. Those who would know what Ginx actually did when little Number Thirteen actually arrived, must read the book for themselves. Our part is only to point out that thousands meet the same problem which thrust itself upon Ginx, and various are the solutions of it which are offered.

With some the problem is faced at a somewhat earlier stage, and study how to *avoid* offspring instead of proposing to get rid of them by war as Malthus suggested, or by drowning them like kittens, the only way which occurred to poor Ginx.

Of course, a difference of opinion exists as to the morality of seeking to *avoid* offspring. Unquestionably, the natural and proper purpose of marriage is the production of children. Yet the question remains, how many children is it the *duty* of a married couple to have? Obviously, a number cannot be stated which would be a proper rule for all married couples, without regard to circumstances. Various circumstances have to be considered, as the ability of the parents to properly maintain, educate and equip for the battle of life, a greater or less number of children, the physical ability of the mother to stand the drain of frequent maternity, or her physical suitability for safe delivery.

For the first circumstance, the finanancial ability of the parents, we think it will hardly be denied that, unless the State shall undertake the maintenance of surplus offspring, it cannot be the duty of the parents to bring into the world children whom they are unable to properly rear, who must necessarily be unfit, by reason of such improper feeding, clothing, or education, to either live happily themselves, or to add anything to the sum total of human good.

Also, we think it must be admitted that it is not the duty of any woman to continue to bear children, when to do so is to either bring destruction upon herself, in child-bed, or in the vital drain of pregnancy and nursing, or to produce children when her own

condition is such that the children are almost certain to be born diseased, or deformed, or weakly in constitution.

Some desire to avoid offspring for reasons quite different from any given above. For instance, the wife or husband, or both, wish to avoid the duties and responsibilities of parenthood; or they are, or one of them is, unwilling to forego even for a time the pleasure of sexual intercourse, or the wife will not consent to the abstinence from balls, parties, and other society functions, from which a condition of pregnancy would make it necessary for her to stay away for a time; or she simply declines the discomforts of pregnancy and the pains of confinement. With these latter reasons for refusal of parenthood we have no sympathy, but there is no doubt that they operate much more generally than the legitimate reasons first set out. It is largely on account of the avoidance of offspring for these latter reasons that the decrease of population in France is hastening that nation to decay, and the same condition of things prevails to an alarming extent also amongst the wealthier classes in America. Rev. John Todd, author of the "Student's Manual," says: "It has become the fashion for parents to be leading round a solitary, lonely child, or possibly two, it being well understood, talked about and boasted of, that they are to have no more. The means to prevent it are well understood instrumentalities shamelessly sold and bought, and it is a glory that they are to have no more children." The language of Dr. Napheys is even stronger. Quoting Rev. John Todd as above, he adds: "This is sadly true, especially in the cities and larger towns of this country.

"Its results are even more conspicuous in France. Dr. Bergeret, a prominent physician in one of the provincial towns of that country, draws a striking picture of the demoralization it has brought about. He shows how the bonds of public morality have been loosened, the sacred institution of marriage converted into legal prostitution, woman sunk in respect, man yielding to unnatural debauches, losing his better impulses to plunge into sensuality; diseases and debility gaining ground, the number of births constantly decreasing, and the nation itself falling a prey to its rivals through a want of effective soldiers. The picture is a gloomy one, and is probably but little overdrawn.

"If it is true that the native American population is actually dying out, and that year by year the births from couples born in

this country are less in proportion than those from couples one or both of whom are of European birth, as many have asserted, then we must seek the explanation of this startling fact either in a premature decay of virility, or a naturally diminished virility in middle life in the husbands, or to an increased tendency to sterility in the wives, or else (and this has been, perhaps, the hasty conclusion of most writers) we must suppose there is a deliberate and widespread agreement between those who are in the bonds of matrimony, that American women shall be childless, or the next thing to it."

But let us return to the legitimate avoidance of further offspring, for reasons quite sufficient, such as the inability of the parents to give them a proper physical and mental equipment, or considerations of the health or life of the mother. There is only one absolutely safe and certain means of avoiding conception, namely, abstinence. But it is absolutely useless to recommend that which certainly not one in a hundred will adopt. In many cases such a course would be distasteful to the wife; in most cases it would be more so to the husband, and complete abstinence at home would very probably lead to illicit indulgence elsewhere. But there is a qualified and partial abstinence which, judiciously exercised, will very greatly lessen the chance of conception. As pointed out elsewhere in this book, conception can only take place when a spermatozoon of the male meets and enters an ovum, or egg, of the female. This, of course, can only occur while an egg is in course of passage from the ruptured Graafian Cell to the uterus. There is a period, from about the middle of the time intervening between the menstrual periods to near the end of that time, when there is no egg so in course of passage, a period of from three or four to twelve or fifteen days, the length of time varying in different women. During this period, then, connection may be had with reasonable freedom from risk of conception.

There are, of course, some uncertainties which attend this method. First, the exact time, with reference to the menstrual period, when the egg leaves its cell, is not certainly known. Opinions differ as to whether the Graafian Vesicle, or cell, is ruptured and the egg escapes just before, or during menstruation, or just at its close, or a day or two later. The better opinion seems to be that the ovulation occurs about the time, or a day or two before the time when the menstrual flow appears. Certainly con-

ception may take place from connection had from a day or two to four or five days previous to the time for appearance of the menses, and as the spermatozoa probably do not live longer than a few days, the egg must be ready for impregnation during that time. Second, the time the expelled egg remains in the Fallopian Tubes, where only, according to the best authority, it may be impregnated, is uncertain, and varies in different persons probably from two or three days to five or six, or even seven days or more, and the time it remains in the womb, where, according to some physiologists, it may be impregnated, is equally various and uncertain. Thirdly, though there be no egg *en route* at the time of connection with the male, yet the spermatozoa of the semen injected during intercourse may remain for some time in the female genitals, ready to impregnate the egg when it appears; the time during which the semen will retain its vivifying properties is uncertain, but is probably two or three days, or even longer. Fourth, the fact of menstruation is not always certainly known. In some cases a slight flooding, or bleeding from the veins may be mistaken for the catemenial flow, and time reckoned from that would be deceptive. On the other hand, the real monthly flow is sometimes so scanty, and so light in color, that it is not recognized as such, and there may be an egg available for fertilization, without its being suspected.

Notwithstanding all these uncertainties, the probability of conception where intercourse is had at this period only, so far as it can be ascertained, is immeasurably less than where it is indulged in without such restraint, and for almost any married couple, the observance of this agenetic, or sterile period, say from twelve days after one catamenial period, to five days before the beginning of the next, reduces the probability of pregnancy quite low enough. This plan, too, allows a reasonable indulgence of the husband's amatory instincts and those of the wife, without any of the risks and objectionableness incident to those means sometimes used, and which we can mention only to condemn.

The use of various injections is only to be condemned. Some inject cold water immediately after copulation, to destroy the spermatozoa. It is true that cold water will kill those living organisms, but not only is it liable to miss some of them, as where the semen has been thrown well up into the womb, but the chill from cold water is liable to produce inflammation and disease of

the womb. The same may be said of injections of solutions of strychnine and other poisons. They are by no means *certainly* effectual to prevent conception, and they seriously endanger the health and even the life of the woman. Moreover, the use of injections and the consciousness during connection that they are to be used, measurably destroys the pleasure which she might otherwise derive from it.

Another practice which is highly improper is that of preventing the emission of the semen by pressing on the urethra near the root of the penis. The effect is to force the semen back past the interposed *vera montanum* into the bladder, whence it is afterwards carried out with the urine. The habitual use of this means soon destroys the power of the *vera montanum* to prevent the semen from being thrown back into the bladder, the man becomes the victim of urinary spermatorrhœa of the worst type, and quite impotent and unable to even perform the sexual act, much less to beget children.

The practice of Onanism is another practice abominated of God and of all well-constituted men and women; that is, the withdrawing of the male organ at the critical moment and allowing the semen to be spilled. It was this means which was adopted by Onan (see Genesis xxxviii., 6-10) when, being required to marry Tamar, the widow of his deceased brother, and to rear children to inherit that brother's estate, he, having indeed married her, desired to *avoid* children by her, so that *he* would be his brother's heir. This practice is not only demoralizing to the man, but is exceedingly injurious to the woman, the interruption of the connection at the highest pitch of the orgasm or sexual excitement almost invariably causing great nervous reaction, and eventually falling of the womb and other disorders.

The use of various mechanical contrivances, such as French Safes, Condom Sheaths, etc., is also objectionable, on the ground, first, that anything which prevents the actual contact of the parts is liable to cause nervous disorders, and second, that various accidents are liable to happen to prevent their efficacy.

Another great objection to all these devices is that they foster in the mind of the unmarried an idea that they may commit fornication with impunity, and that their sin will not betray them by the production of unwelcome offspring. Such persons may as well understand that they cannot hope by any of these means to

continue to enjoy a reputation they do not deserve, nor to permanently escape the reproach due to their conduct.

And to married people be it said, that many high-minded persons look upon the regular practice of sexual intercourse, while preventing conception by artificial means, except for very strong reasons, as little better than prostitution, and the wedded condition, under such circumstances, as little better than a license to commit fornication.

If for any reason it be *necessary* to avoid conception, then the husband, if he cannot restrain himself in her presence, should adopt the course in common practice amongst the higher classes in England, namely, sleep in a separate room from his wife, and only visit her bed at that agenetic or sterile period ten or twelve days after the cessation of each menstrual flow.

A false notion exists in some quarters, and is fostered by some ignorant writers, and by the advertisements published by unprincipled knaves in some newspapers, that frequent sexual intercourse is necessary to the male health. Nothing can be less true; and the history and statistics of man show that there is no condition of life more healthful than that of a bachelor who is chaste both in body and *mind*. It is unboubtedly true that if a man foster and encourage the sexual instinct in himself by allowing his mind to dwell on the idea of copulation, he is apt to become morbid and more or less unbalanced; but the cure for such a malady is not fornication, but either marriage and a moderate indulgence of his passions, or a mitigation of them by diligent mental and physical exercise.

If, then, means for the prevention of conception are to be sparingly used, what shall be said of the practice of *Criminal Abortion;* simply this: it is utterly and without qualification *damnable*. Words cannot be found nor invented to condemn it too strongly.

This vile practice is by no means confined to unmarried females who seek to preserve a reputation different from their true character, but is unfortunately much in vogue amongst married women. The reasons are usually the same as those referred to above as reasons *not* legitimate for the prevention of conception; the woman or her husband objects to having a large family, or to suspending their sexual or social pleasures. Amongst the poor, whose excuse would be their inability to maintain the child, the

crime of abortion is almost unknown. But it is in fashionable society where it rears its ugly head, and is scarcely even ashamed. Yet in most civilized countries it is a crime, not only in the sight of God, but in the eye of the law.

The Criminal Code of Canada has the following provision on the subject:

"Sec. *271*. Every one is guilty of an indictable offence and liable to imprisonment for life who causes the death of any child which has not become a human being, in such a manner that he would have been guilty of murder if such child had been born.

"2. No one is guilty of an offence who, by means which he in good faith considers necessary for the preservation of the life of the mother of the child, causes the death of any such child before or during its birth.

"*272*. Every one is guilty of an indictable offence and liable to imprisonment for life who, with intent to procure the miscarriage of any woman, whether she is or is not with child, unlawfully administers to her or causes to be taken by her any drug or other noxious thing, or unlawfully uses any instrument or other means whatsoever with the like intent.

"*273*. Every woman is guilty of an indictable offence and liable to seven years' imprisonment who, whether with child or not, unlawfully administers to herself or permits to be administered to her any drug or other noxious thing, or unlawfully uses on herself or permits to be used on her any instrument or other means whatsoever with intent to procure miscarriage.

"*274*. Every one is guilty of an indictable offence and liable to two years' imprisonment who unlawfully supplies or procures any drug or other noxious thing, or any instrument or thing whatsoever, knowing that the same is intended to be unlawfully used or employed with intent to procure the miscarriage of any woman, whether she is or is not with child."

In Canada, happily, the law against procuring abortion is rigidly and vigorously enforced, and nothing of the kind is winked at. On the contrary, in some of the United States of America, similar laws are administered with a very faint heart and lax hand, the professional abortionists being neither afraid nor ashamed to advertise their imfamous services.

Almost the most shocking and disgusting feature of the business is the conduct of some husbands, who not only allow but

encourage, in some cases almost compel, their wives to pass through this dangerous and shameful ordeal.

Why do we speak in such strong terms of this practice? First, because it is *murder*. From the moment of conception a new being has been ushered into existence—a *human* being—notwithstanding the implication in the above quoted section, 271 of the Canadian Code to the contrary. If not, then when does it become a human being, to take whose life is murder? At birth? But a child may be born at seven months, or earlier, in consequence of some accident, and live; and it cannot surely become human by accident.

The fact is, that from the beginning it is a separate entity, it exists separately from its mother, getting its sustenance from her blood as later it gets it from her breast; and to kill it by violent separation from its mother before the time, is truly child-murder, the murder of her own innocent, helpless, speechless child, as truly so as if she strangled her new-born babe, or

> "While it was smiling in her face,
> Have plucked her nipple from his boneless gums,
> And dashed the brains out."

Father, mother, know you not that your babes, assassinated in their mother's womb, will not at Judgment Day be speechless, but, in the face of an avenging God, will stand before you and denounce you as their murderers, their selfish, brutal, cowardly murderers. Think you the little, new life is of no value? Who made you judge of the value of a human life? Is your child of less value than another's born a month ago? Is this new life, with all its possibilities of joy and beauty and usefulness, of less value than that of the worn out, decrepit, doting, old man, or of the vile and corrupt of middle age?

Better far to suffer the pangs of confinement a score of times; better to starve with your too numerous children, whom you are unable to maintain (but it is not the poor who commit abortion); better to die in the throes of childbirth if need be, than to imbrue your hands in the blood of your helpless child, and live with the stain of this horrid sin upon your conscience.

But if the tender feeling of maternal love be exchanged for the worship of ease, or frivolity, or sensuality; or if the dead conscience cannot rouse a pang of horror or remorse for the murder of

her own children; or if neither the fear of God nor of the laws of the land is before her eyes, yet let her selfishness know that an outraged Nature will not let her go unpunished; for these artificially-produced abortions are the constant cause of violent and dangerous womb diseases, mental weakness, imbecility, insanity and death.

And what shall be said of the man who urges, or who willingly permits a woman, on his account and to gratify his passion or his selfishness, to suffer this damnation of soul and body? I leave it to my candid readers to say.

What is the occasion for this chapter? I answer; the occasion is the unbridled passion of men. In scarcely one case in a hundred does the necessity for means to prevent conception arise from the passion of the woman. If, then, the husband would restrain himself; if he would act the man, whose body is subject to his mind and soul; if he would

> "Envy not the beast that takes
> His license in the field of time,
> Unfettered by the sense of crime,
> To whom a conscience never wakes,"

then man-plagued woman would not be forced to look round for means to forestall or outwit the natural, God-ordained results of his embraces. But if he will not, for the sake of a woman he professes to love, keep his passion under bit and bridle, then he should betake himself to the Orient.

> "There the passions, cramped no longer, shall have
> scope and breathing space;
> He may take some savage woman, she shall rear
> his dusky race."

CHAPTER XXI.

PRODUCTION OF SEX AT WILL, AND HOW TO ASCERTAIN THE SEX OF THE UNBORN CHILD.

THE question has been mooted for centuries, can a child of either desired sex be produced at will? Various theories have been suggested. For example, that the semen from the right testicle produces males and that from the left females, and that, therefore, if the husband lie upon his right side during coition, the right testicle will receive more pressure than the left and a male child will result, and vice versa, the left side for a female child. But the fact that a man with only one testicle can become the father of both boys and girls, rather upsets this theory.

Some, again, attribute the sex to the female element, and say that the right ovary produces males and the left females. Here, again, the facts are against the theory, for a woman with only one ovary has been known to produce both male and female children.

In all ages, people have for various reasons desired to produce at will a boy or a girl, as the case might be. An example of this, occurring this year (1897), is that of the Duchess of Marlborough, Consuelo Vanderbilt. Lord Randolph Churchill was younger brother to the Duke of Marlborough, and, as the Duke had no son, Lord Randolph was heir presumptive to the title; that is he would inherit it if the Duke should die without a son. Lord Randolph died, but he left a son, who succeeded his father as such heir presumptive. The Duke, who had married Consuelo Vanderbilt, of New York, very much desired to have a son, who should inherit his title and estates, and when a few weeks ago a son was born to the Duchess, as much fuss was made about it as if an heir were born to a European Sovereign; and, no doubt, under the circumstances, a daughter would have received as indifferent a welcome as did poor Florence Dombey, who should have been a boy

And in humbler walks of life, I have and everyone has known

frequent instances in which the parents most ardently hoped that the next would be a girl, or a boy, as the case might be.

This being so universal a desire, the advent of a fairly workable and reliable plan for the production of the sex at will is hailed with equally universal delight.

Dr. Fowler argues that the pre-determining factor in sex is the comparative degrees of passion in the man and woman at the time of coition. This would seem to be refuted by the fact that conception may occur without any passion in either parent, as where semen escapes from a male in the absence of excitement, as sometimes occurs, and is artificially cast into the passive and unexcited vagina of the female, producing conception. And, even where the copulation is with strong passion in the male and entire apathy in the female, the result may, nevertheless, be a female child.

There is little doubt, however, that the method known as the *Thury* plan, or by some, the Agricultural plan, is pretty successful. This plan is mentioned and approved by Fowler, only to be immediately explained, or attempted to be explained, away by him on the theory just mentioned. It is adopted with unqualified belief by Dr. Napheys.

The plan is thus suggested and outlined by Fowler: "Early in my boyhood the Reverend Mr. Crawford preached in Liberty, N. Y., my native village, and boarded with my father. Old Mr. Cook, father of Constant Cook, the Bath millionaire, promised to give him a colt as his yearly subscription, telling him he would have it male or female, as Crawford might prefer."

"What! You make my colt a male if I say male, or female if I say female? Can you pre-guarantee the sex I prefer?"

"Yes, every time, infallibly."

"How? By what means? What is your secret?"

"When I want a female colt I couple the parents just as soon as the female's heat commences, [and as soon as possible after they see each other]; but if I want a male I wait till her fever is so far spent that she will barely receive him, [and hold him back till his passions are all tantalized into a frenzy]."

The brackets are mine, and are used to signify that, in my opinion, those portions of the plan are not material to the result.

Fowler goes on: "The Agricultural theory, as it may be called, because adopted by farmers, is that impregnation occur-

ring within four days after the close of the female monthlies produces a girl, because the ovum is yet immature, but that when it occurs after the fourth day from its close, gives a boy, because this egg is now mature."

Most advocates of this theory do not attempt to fix the period so precisely as this. And, on the theory as Fowler states it, women of the Jewish religion should produce nothing but boys, for with them copulation does not take place until *seven* days after the cessation of the monthly flow, unless, which may very well be, conception should arise from connection had during the four or five days previous to the commencement of menstruation. According to the theory that the less mature eggs produce females, the product of connection had just before menstruation should inevitably be females.

Many authorities consider this *Thury* plan infallible. Professor Thury, who was an eminent French Veterinary Surgeon, himself states the law thus: "If you wish to produce females, give the male at the first signs of heat; if you wish males, give him at the end of the heat."

The experience of many observers has confirmed this in its application to both the lower animals and to human beings, the menstrual period and a few days before and after being taken to correspond to the Heat in the lower animals.

An eminent Swiss stock-grower writes: "In the first place, on twenty-two successive occasions I desired to have heifers. My cows were of Schurtz breed and my bull a pure Durham. I succeeded in these cases. Having bought a pure Durham cow, it was very important for me to have a new Durham bull, to supersede the one I had bought at great expense, without having to chance the production of a male. So I followed, accordingly, the prescription of Professor Thury, and the success has proved once more the truth of the law. I have obtained from my Durham bull six more bulls (Schurtz Durham cross) for field work; and having chosen cows of the same color and height, I obtained perfect matches of oxen. My herd amounted to forty cows, of every age.

"In short, I made in all twenty-nine experiments after the new method, and in *every one* I succeeded in the production of what I was looking for—male and female. I had not one single failure. All the experiments have been made by myself, without

any other person's intervention ; consequently I do declare that I consider as real and certainly perfect the method of Professor Thury."

Similar experiments were tried on the farm of Napoleon III., the late Emperor of the French, with like results. Many other breeders have proven the same thing.

The London Lancet publishes a statement by Dr. Packman, of Wimborne, in regard to the results in human beings. Says he: "In the Human female, conception in the first half of the time between menstrual periods produces female offspring, and male in the latter. When a female has gone beyond the time she counted upon, it would generally turn out to be a boy."

A writer in the *Medical and Surgical Reporter*, of Philadelphia, for February 8th, 1868, says, in regard to numerous instances which have been observed by him: "Whenever intercourse has taken place in from two to six days after the cessation of the menses, girls have been produced; and whenever intercourse has taken place in from nine to twelve days after the cessation of the menses, boys have been produced. In every case I have ascertained not only the date at which the mother placed conception, but also the time when the menses ceased, the date of the first and subsequent intercourse for a month or more after the cessation of the menses."

On June 20, of the same year, another physician, writing in the same journal, relates similar experiences.

The cause of this phenomenon of sex-production seems to be that the ovum at first is asexual, incapable of fecundation ; about the time it is expelled from the Graafian Vesicle, it has developed to such a point that if then impregnated, further development as an independent ovum ceases, the male element coalesces with it as it then exists, and a female fœtus results ; if, however, the impregnation be delayed a few days, separate development and preparation of the ovum continues, and if impregnation then takes place, the result is a male fœtus.

Ascertaining the Sex. If it be mere curiosity, it is a very excusable curiosity in the parent who wishes to know before a child's birth of what sex it will be found to be. And it will be a surprise to many to learn that this can, after about the fifth month of pregnancy, be told with pretty reasonable certainty. From what has been said above, it will be seen that if a wife knows at what

time in her month conception took place, she can confidently predict the sex; that is, if it occurred within a very few days after the cessation of the monthly flow, the child will be a girl, but if it took place ten or twelve days after, the child will be a boy. But in some cases, indeed in most cases, connections have been frequent, and she cannot tell which was fruitful; or conception may have occurred say six or seven days after the flow, so that one cannot say whether the degree of maturity of the egg (if that be, as many suppose, the determining cause of sex), is such as to produce a male or not. Where a woman goes beyond the period at which she calculated the two hundred and eighty days to end, then it is likely that conception actually took place a little later than she supposed, and that the child will be a boy.

If, however, she be unable to fairly guess the sex from the period of conception, or if, having calculated it, she desire confirmation of her supposition, the frequency of the fœtal heart-beat affords a fair test of sex, the pulsations being more rapid in female than in male infants. On observation of the heart-beat of twenty-eight female fœtuses, the rate was found to average one hundred and forty-four to the minute, the lowest being one hundred and thirty-eight; and in twenty-two males observed, the average was found to be one hundred and twenty, the lowest being one hundred and twelve. From these observations there appears a very decided difference, and the rule may be confidently stated, as follows: If the fœtal heart-beat be over one hundred and thirty to the minute, the infant is a daughter; if under one hundred and thirty to the minute, a son.

The pulsations, after a little trying, may be made out quite distinctly, during the last three or four months of pregnancy, by placing the ear firmly against the abdomen about on a level with or a little below the navel. The spot where the fœtal heart is to be found is indicated in Plate XVII. It is liable to be overlooked at first trial by the inexperienced, on account of its unexpected rapidity, by which also it may of course, be distinguished from the pulse of the mother, or of the listener. Of course, also, the rapidity of the fœtal pulse may be affected, temporarily or otherwise, by circumstances, such as illness of the infant; and the exertion of the movements which it makes in the womb will considerably increase the rapidity of pulse for the time.

CHAPTER XXII.

THE HYGIENE OF PUBERTY: MALE.

AT a certain period, called the period of PUBERTY, the male youth undergoes a number of physical changes, all others relating to the central and most important one, the secretion of the fertilizing fluid, called the Semen or Seed.

These changes do not take place suddenly, but extend over a good many years, during which the growth is completed and all the physical powers matured. When these various processes, which we presently shall describe more fully, are complete, the period of *virility* (Latin—*vir*, a man) or manhood is reached; and then, and not till then, is he fit to properly discharge the duty peculiar to his sex.

Let us first observe these physical changes. The skin, which during childhood was comparatively fine and delicate, becomes coarser, the muscles firmer and stronger, and the general appearance begins to gravitate towards that of manhood. The vocal organs enlarge the voice loses its childish treble, and becomes rougher and deeper, the change in depth usually amounting to what the musician calls an octave. The skin on the lower part of the face becomes covered with a soft down, which gradually becomes coarser and thicker till it develops into the manly beard. The bones gradually harden. The penis and testicles enlarge, and the latter begin to secrete the semen. Around the root of the penis, and especially on the pubes, a hairy growth, something like the beard but shorter and softer, gradually develops; a hairy growth also appears in the armpits, and sometimes on the breast, forearms, and some other parts of the body.

The mental changes which accompany these physical alterations are not less striking. If well brought up he devevelps a manliness of bearing and a chivalrous disposition of mind, to which he was before a stranger. This is apt to be particularly noticeable in his attitude towards his mother and sisters. He is no longer the child to be merely petted, fed and clothed, but he begins to feel himself their protector, and is regardful of their comfort and of their wishes and feelings as he never was before.

He does not understand the reasons of this change, and is sometimes surprised at those physical changes he sees in himself. He feels v gue and unaccustomed desires and sensations, impulses before unknown, sometimes an accession of bashfulness to which he had been a stranger. Sometimes he develops an uneasiness, a restlessness, even a wilfulness and perversity which surprise and grieve his parents and friends. This is a period when the care of the boy requires all the love and *tact* of which his parents are capable. There is a new spirit awakening within him, a spirit not to be overcome by chiding, much less beaten down by harshness, threats and violence, but to be guided and directed and moulded into the spirit of a MAN, pure, clean and noble, not reckless, sensual or criminal. The father of boys should look forward to this age and, if for nothing else, should keep himself young for their sakes. There is no such master mariner for the boy's bark on the stormy and treacherous waters of puberty, as a pure, sympathetic and *informed* father, and no such anchor as his love for a mother in whom he believes and who believes in him.

It is highly important that the sexual development should not be hastened, but that the physical and mental development should at least keep full pace with it. To accomplish this end, all reading, sights and thoughts which tend to sexual excitement should be carefully excluded, and this can be done in no way so well as by occupying his time with proper mental and physical exercise.

There is nothing else so useful in preventing sexual precocity as physical exercise—regular, systematic, vigorous, daily exercise. The school gymnasium, with its ladders, horizontal bars, rowing machines, Indian clubs, dumb bells, etc., and especially the foot-ball, lacrosse, cricket, "shinny," hare and hounds, and other out-door games of boyhood are means of salvation, and no school is worthy of patronage, or a safe place for boys, which has not proper provision for physical culture.

Intellectual occupation, especially with mathematical studies, is also highly important, as the mind of youth, when occupied with severe toil, does not brood over the strange sensations and new desires now awakening. Care should be taken that study is not pushed to the exclusion of the necessary physical exercise.

And while speaking of schools, we would impress it on teachers and on the trustees, or others who have the control of schools,

as well as on parents, that ignorance of the facts pertaining to his sexual nature is a fruitful source of evil to the youth as puberty progresses. The great purpose of his sexual being, the evils and dangers of abuse, and the proper conduct of himself should be explained to him as his understanding will admit; and if this cannot be done by the teacher, then a fit medical man should be employed to teach these things.

To proceed: *Cleanliness* is very important; a sponge bath, or shower bath, in cold water every morning is highly beneficial, and boys should be made to understand that a feeling of heat or irritation in the sexual organs probably arises from the need of a a thorough cleansing. Particularly, they should be taught to draw back the foreskin and remove the sebaceous accretions under it, about and near the cervix of the penis. The secretions of the glands there are very often allowed to accumulate and harden till they adhere to the *glans penis* and cause sores, irritation and sexual excitement. The boy, in many cases, does not even know that this is a thing to be removed. The frequency of this condition, with the nervous disorders, and other evils which follow in its train, has led to the opinion which is yearly becoming more general amongst physicians, that the prepuce or foreskin is an outlaw and ought to be cut off.

Mr. William Acton, of London, says: "My own opinion is that a long prepuce in children is a much more frequent cause of evil habits than parents or medical men have any idea of. But I have never heard of any step ever having been taken by those having the care of youth to induce boys to adopt proper habits of cleanliness in this respect. Probably no nurse, parent or schoolmaster would at first relish the proposal that a boy of twelve should be told to draw back his foreskin and cleanse the part thoroughly. In my own experience of children I have found this practice so beneficial that I never hesitate to recommend it in any cases where there is the least sign of irritation from this cause."

In many cases in earlier childhood, and sometimes in puberty and even manhood, the person is afflicted with an inveterate phimosis, or constriction of the foreskin, causing it to bind tightly round the glans penis. In some cases the aperture is so small that it cannot possibly be drawn back over the glands so as to permit cleansing. In such cases the best informed physicians of the present day invariably recommend that the foreskin be cut

away completely by the operation of circumcision. Indeed this operation is steadily growing in favor with medical men as a preventative of uncleanness and irritation, as well as to remove a dangerous receptacle of the virus of venereal disease.

Dr. Remondino, in his work on Circumcision, argues in the strongest manner for the complete and universal removal of the foreskin, as a menace to health, a frequent cause of bed-wetting, masturbation, nocturnal emissions, nervous disorders, palpitation of the heart, gangrene of the penis, cancer, venereal disease, etc.

Dr. Edward Clark says: "The instructors in the houses and schools of our country's daughters, would profit by reading the old Levitical law. The race has not outgrown the physiology of Moses."

Whether or not we can agree that such an heroic measure as is prescribed by the law of Moses is always desirable, there can be no doubt that uncleanness or constriction of the prepuce is a fruitful source of evil habits and derangement of the health, both in young children and in boys during puberty.

Sometimes, too, the adhesions of the foreskin to the glans penis, which are quite usual at birth, continue during childhood and youth, and cause much injury to the health. Such instruction as we have advised to be given to boys, mentioning also this wrong condition, would lead to its discovery and to its being remedied.

Irritation of the genital organs from any cause should be avoided. Such irritation may arise from various causes, as ill-fiting trousers or drawers, the heat of too much clothing about the parts, uncomfortable seats or too soft ones, costiveness of the bowels, urinary or bladder troubles, piles, seat worms, etc. Various skin diseases, if they attack the parts, or those surrounding, should receive prompt attention, as the irritation leads to scratching and handling the parts and to evil habits. Too much heat from clothing or otherwise is to be avoided. Cane-bottomed or even wooden chairs are preferable to soft cushions, and mattresses to feather beds.

The *Sleeping* accommodation of the boys often receives too little attention. Where at all possible, every boy should have his own separate bed, or better still, his separate room. All the surroundings should be such as to promote modesty, and all indecent and indecorous behaviour should be carefully discouraged. The

sleeping rooms should be cool and well ventilated, and such as shall receive the purifying sunshine through the windows.

The boy should be taught to empty the bladder before going to bed, as a full bladder irritates the surrounding organs. The pressure of the bladder upon the seminal vesicles and vasa deferentia, when the person lies on his back, often excites the sexual organs, causing erotic dreams and nocturnal emissions; for this reason boys should be warned against sleeping on the back.

The habit of flogging either boys or girls is not one to be approved at best, but the very common practice of flogging on the seat is most reprehensible. Parents and teachers are apt to suppose that an eminently proper place for the application of the rod or strap, because no bones are likely to be broken there, nor are any bruises there inflicted likely to be shown about to win the pity of sympathizing friends. But the practice is due to ignorance of the physiological effects of whipping administered on that part. It is well known to physiologists and others who have paid some attention to the matter that switching across the seat is one of the most powerful excitants of the sexual feeling, and it is resorted to in France and other places by depraved and debauched wrecks to stimulate and arouse a sexual excitement which their excesses have all but destroyed. Those whose duty it is to care for boys should make a note of this fact.

The age at which puberty begins varies a good deal, according to temperament, climate, occupation, habits, environment, race, etc. Generally speaking it begins at from twelve to eighteen years, and virility may be said to be completely attained at from twenty-three to twenty-seven years of age.

Stout, phlegmatic, light-haired boys of lymphatic temperament are later in arriving at the age of puberty than those of nervous temperament.

In warm Southern *climates* both sexes probably arrive at maturity earlier than in colder climates. Some writers, however, doubt that this arises from the influence of the climate, but think it due to the social habits of the people, where sexual matters are the subject of common conversation, and where vice is more open. Whatever the reason may be, there is no doubt that in the warm climates the young attain their sexual capacity younger, and, so far from its appearing to injure them, they retain it probably later than in Northern countries. In Abyssinia and other parts of

Equatorial Africa, it is said that it is quite usual to see boys of fifteen or sixteen years of age who are already fathers. On the contrary, in the cold Northern countries of Europe the boys usually reach eighteen years or older before puberty begins, and they do not appear to retain their masculine powers very long.

Heredity manifests itself in the period at which puberty is reached as well as in the other characteristics, and it is matter of common observation that a long succession of women, mother and daughter, marry and bear children young. The variation in *race* is also noticed in the greater sexual precocity of negro boys and of the sons of the other races of the South.

The *constitution* also has much to do with the early development of the sexual passions. Strange as it may seem, boys who are weak, nervous and debilitated, are apt to be sexually precocious, and to develop these instincts much earlier than those of robust, sturdy, vigorous physique. There may be a doubt, however, whether this precocity is the result of weakness and nervousness, or whether both are mere results of undue excitement of the organs by self-abuse.

The *occupation and habits* also exert a great, almost a controlling, influence upon the maturing of the sexual capacity. One would expect, perhaps, that those exercises and habits which develop the frame and encourage the bodily functions in general, would promote the maturation of the sexual organs also; but the reverse is the case, and the vigorous cultivation of the muscles is in effect the equally vigorous repression of the sexual development. The perfection of physical development exhibited by athletes is to a certain extent attained at the expense of the development of the organs of generation. Dr. Carpenter states the case thus: "The Development of the Individual and the Reproduction of the Species stand in an *inverse* ratio to each other."

CHAPTER XXIII.

THE HYGIENE OF VIRILITY.

IN North America and the Northern countries of Europe, the period of virility, or perfect manhood, may be said to begin about the age of twenty-five years, and to close at forty-five years. It must not be understood, however, that this period marks the limit of procreative capacity.

The seminal fluid usually begins to contain the spermatozoa, or living animalculæ which make it fertile, at a much earlier age than twenty-five; they have been observed in the discharges of boys as young as eleven, though this is very unusual, and they generally make their appearance as early as the age of sixteen or eighteen years. But at these early ages the spermatozoa formed are few, small and weak, and if the boy then becomes a father the offspring are likely to be weak and liable to disease. About the age of twenty-five these living germs become much more vigorous and numerous, many hundreds being contained in a single drop of the fecundating fluid; and the children then generated are apt to have a much better start in life than those of boy-fathers. Until complete virility is attained, marriage should not take place. Also, after the decline of life has begun, the spermatozoa again gradually diminish in numbers and vigor till they disappear altogether. There is, however, a much greater variation in the age at which this decay begins than in the age of puberty. Many notable instances have been known of the retention of the virile powers to a great age, of which some are cited earlier in this book. The writer is acquainted with an old Scotchman who, at the age of seventy-six, married his third wife and became the father of a splendid pair of twin boys.

There is probably no bodily capacity which men are more loath to lose than the procreative power. Hence men's distress upon the loss or supposed loss of virility is a source of great profit to those knaves and quacks who advertise all sorts of medicines and appliances to restore lost manhood. Of all these things, on which undoubtedly millions of dollars are annually spent, probably none, or next to none, are of any benefit whatever, while some of them are highly injurious. If a man feel his sexual powers waning, he had best consult his own or some other reliable physician,

make a clean breast of his condition and habits, get the physician's advice and act upon it.

The use of so-called Aphrodisiacs, or medicines to increase sexual passion, is of little avail, and many of them produce a certain temporary excitement which is followed by a reaction of much greater weakness and incapacity than before, and there is no surer way to ruin the sexual powers completely than to stimulate them with these drugs. If the powers decline, the directions given in an earlier part of this book may be safely followed, and almost invariably with good results. Some of these drugs are certainly capable of stimulating the sexual feelings to the highest pitch, even to insanity.

Ergot, or rye-smut, which is used sometimes to produce abortion in females, will cause great ardor in males, and it is said that in those countries where rye bread is a staple food, the men are noted for their ardent, though early lost, sexual passion, and the women for the frequency of miscarriage.

Phosphorus is a powerful and dangerous excitant of erotic passion, and should never be used except under the direction of a competent physician. Indeed instances have been known of a perfect frenzy of sexual excitement produced by even medicinal doses of this drug, both men and women, usually proper and modest in their demeanor, becoming so insanely excited as to forget all considerations of prudence and decency. In some cases the erotic mania continues till death ensues. A safe formula is given in Ch. XIV.

Ether and *Chloroform* sometimes produce similar feelings in those subjected to them. Sometimes the patient, while under the influence of one of these drugs, experiences the warmest desires, and sometimes even imagine them in process of being gratified. Cases have been known in which a woman, who has taken ether or chloroform to have a tooth extracted, has imagined that the dentist was assaulting her.

One of the drugs most popularly supposed to be an ingredient of "love potions" is *Cantharides*, or Spanish Flies. The fact is that upon most persons this dangerous drug has little effect as an Aphrodisiac, unless given in poisonous doses, and then only by producing inflammation in the genital organs, as well as in the surrounding parts.

Some *odors* have the effect of exciting the sexual feeling, particularly those which are produced from the genital organs of

animals, as *Musk* and *Civet*. This is not to be wondered at, when it is remembered that these substances, in their natural place, were intended by nature for the very purpose of exciting such passion in the animal of the opposite sex. Indeed even the perfume of flowers, which is only emitted during the period of their sexual conjunction, produces much the same results, and probably for a similar reason. The exciting effect of the use of all these extraneous substances is only temporary, and tends to shorten rather than to prolong virility.

The influence of food and drink upon the sexual organs and the prolongation of the manly powers, is greater than is generally supposed.

It is necessary to a proper continuance of the sexual functions, that the general health should be good. Any serious derangement of any of the functions of the body is sure to be reflected in premature decay of the generative capacity. The condition of the stomach, in particular, exerts a great influence for good or bad, as the case may be. Temporary fits of indigestion are usually accompanied by temporary loss of capacity, and confirmed dyspepsia usually weakens, and eventually destroys the sexual powers; and the converse is also the rule, a healthy stomach and vigorous digestion being associated with vigor of the genital organs. Again, high feeding, the use of much stimulating food and drink produces an excess of sexual desire, which is liable to be followed by premature decay. The habitual use of alcoholic liquors, while it excites libidinous feeling for the time, is not conducive to real sexual power, but the reverse.

All good foods which nourish the body will tend to the prolongation of the sexual, as well as of the other bodily, powers. Fruit, fish, meat, game, vegetables, are all nutritious articles of food. Most of the aromatic vegetables and herbs have a considerable stimulating effect, such as celery, onions, asparagus, parsley, mint, thyme, and sage. Spices and condiments, such as pepper, mustard, ginger and nutmegs, have a still stronger effect. The highly-flavored fruits, too, such as peaches and pineapples, are said to have the same properties, but the cooling acid fruits have a contrary effect.

Tomatoes, potatoes, beans and wheaten bread are rather stimulating, as are also sago, tapioca and arrowroot, while Indian corn and rice are not.

The flesh of young animals, as veal and lamb, are of no use for the special nutrition of the sexual organs, while the flesh of older animals is sometimes found highly beneficial. All kinds of fish, but especially shell-fish, are an excellent article of diet to promote sexual vigor.

The preservation of the sexual power depends a great deal on the manner in which it is exercised. Excessive indulgence is very likely to be followed by early decay; on the other hand, absolute abstinence is not conducive to a continuance of the virile power. The best course is a moderate gratification of passion; and indulgence at a *regular period* is found to be a very proper and beneficial course to pursue.

The practice of regular cold bathing of the parts, and the avoidance of excitement except at the regular period of indulgence also promotes sexual longevity.

Also it is wise to time the indulgences prudently, not taking them either when already fatigued by mental or physical exertion, nor when excited about other matters, nor yet just before beginning any arduous labor. In either case the nervous strains of the sexual act, and of the other excitement or labor, come one upon the other, to the injury of both the general and the sexual condition. Neither should this be taken just after a full meal, as the blood and nervous energy are then required to be concentrated at the stomach in the process of digestion, nor yet when hungry, as the vital forces are then low and unfit for the act.

A good course suggested is to awake for the purpose after the body and mind have been composed by two or three hours' sleep, and afterwards a second period of repose may occupy the remainder of the night.

When, however, the man has passed middle life, it is wise to gradually wean himself from sexual indulgence, and to devote his thoughts more and more to the platonic affection of and for his spouse, the enjoyment of his children and grandchildren, and to intellectual pleasures, and unselfish philanthropic projects, crowning his gray hairs with the love and respect of love of those about him, rather than to become what Napheys well terms "that nauseous and repulsive object, a libidinous and worn out old man, heating his diseased imagination with dreams and images which his chilled and impotent body can no longer carry into effect."

CHAPTER XXIV.

IMPOTENCE AND STERILITY: MALE.

THE consciousness of inability to perform the sexual act, or, performing it, of incapacity to beget children, is probably one of the most humiliating conditions in which a man can find himself, and a condition which he will take infinite and generally futile pains to conceal. And even those men who do not desire children, hate to feel their inferiority to the generality of mankind in that particular, worse than in any other. If A is richer than B, or higher in social rank, stronger, handsomer, healthier, wiser and better than B, B can stand it; but if A can be the father of children and B has not the corporal capacity to become a father, it is gall and worm-wood. Accordingly, if B be a married man he lays the blame on his wife, lest he should sink in the respect of his fellows.

Says an eminent writer: "In losing the command of this function at an age when it should be vigorous, man loses his self-respect, because he feels himself fallen in importance in relation to his species. Therefore the loss of virile power, real or supposed, produces an effect more overpowering than that of honors, fortune, friends or relatives; even the loss of liberty is as nothing compared to this internal and continual torture. Those who suffer from injustice or misfortune can accuse their enemies, society, chance, etc., and invent or retain the consciousness of not having deserved their lot; they have, moreover, the consolation of being able to complain and the certainty of sympathy. But the impotent man can make a confidante of no one. His misery is of a sort which cannot even inspire pity, and his greatest anxiety is to allow no one to penetrate his dismal secret."

And we cannot but agree that he does well to conceal his infirmity, for it will, however unjustly, lose him the respect of both men and women; and especially, if he have married, does he forfeit the respect of his wife.

Says Professor Niemuger: "Not only sensual women, but all, without exception, feel deeply hurt, and are repelled by the husband whom they may previously have loved dearly, when,

after entering the married state, they find that he is impotent. The more inexperienced and innocent they were at the time of marriage, the longer it often is before they find that something is lacking in their husband; but, once knowing this, they infallibly have a feeling of contempt and aversion for him."

But it is highly probable that as many cases of childlessness are due to the husband as to the wife

Impotence is defined as inability to perform the sexual act of copulation. It may arise from total absence of the penis or from its extremely small size; from malformation rendering copulation impossible, or from entire lack of the power of erection, or such partial lack of erection, as renders the penis useless for intercourse; temporary practical impotence may result from nervousness or timidity, or other causes.

Sterility, or inability to beget children, may co-exist with perfect ability to copulate. It may be of various sorts. The most usual cause of sterility in such cases is the absence or defectiveness of the spermatozoa or living animalculæ in the semen. In some cases the semen, though perfect and in sufficient quantity, is prevented from reaching the womb by being thrown back past the *vera montanum* into the bladder, or, as in the case of hypospadic subjects, out through an aperture near or at the root of the penis; or through some nervous defect, the semen may not be ejected during copulation, but may pass from him afterwards at stool, or be forcibly ejaculated during lascivious dreams.

IMPOTENCE—MALE.

Impotence may be either fancied or real, and may be either temporary or permanent. Many cases of fancied impotence arise from the nervousness or timidity of the man as he approaches copulation. There is no other bodily function so completely under the influence of the imagination as this one. A sudden emotion may render a man for the time being sexually powerless. Many men, perfectly competent, have been so nervous, or so filled with a fear that they were incapable, that they invariably became impotent whenever they approached the other sex. This timidity is often exhibited in intense agitation, and is followed by such a sinking of the corporal power that not only does erection subside, but in some cases even fainting ensues. And this timidity, so far from being confined to persons of a usually timid nature, is more common in

those who are not nervous in most matters. Indeed, so far from being really impotent, in most such cases there is unusual sexual power, and the very intensity of emotion experienced on approaching copulation tends to the depression and temporary impotence described. Usually it is sufficient for the physician, who may be consulted in such cases, to simply encourage the man with assurance of his capacity, or to give him some mysterious medicine, or appliance or directions, which will do him no harm, and the use of which will reassure him. Often, too, the familiarity which the subject assumes in marriage will cure the excessive excitement and lead to natural intercourse.

Many unhappy marriages, barrenness, divorces, or even suicides, might be prevented by the word of comfort, consolation, advice and information which a wise and experienced physician is able to give when consulted on this subject.

One physician effectually cured a case of impotency caused by fear of failure, by enjoining the young husband to not attempt coition for six nights, no matter how strong the desire might be. The result was that before the time had expired the young man began to fear almost that he had too much power instead of too little, and no further difficulty was experienced.

This temporary incapacity of the earlier days of marriage was the subject of superstitious notions in the middle ages. Men supposed that it was the work of witchcraft, magic, or enchantment; it was called in France, *nouement d'aiguillette* (French—tying of the cod-piece. The cod-piece was a loose bag or flap which covered and gave room for the genitals, the rest of the lower part of the body and the legs being covered with tight-fitting trunk-hose). It is not surprising, then, that in much earlier times a similar superstition prevailed. Herodotus, the father of history, says of Amasis, King of Egypt, that having married a beautiful Greek woman named Laodicea, he found himself incapable of consummating the marriage; and thinking she had used some enchantment, he ordered her to be beheaded. She, however, begged to be allowed time to erect a statue to Venus, the Goddess of Love, assuring the King that by the time the statue should be completed his powers would be restored to him. And naturally enough it so proved.

A sensation of disgust or disappointment, arising from some disagreeable odor or unexpected deformity or ugliness of person,

is almost sure, by extinguishing desire, to produce temporary incapacity; as where a man, having married a woman with full, luscious breasts, the idea of which had whetted his sexual appetite, found, on seeing them, that they were disfigured by an ugly and repulsive birthmark.

"True impotence," says Professor Lallemand," consists of want of power, not once, but habitually; not only with prostitutes, but with those we love; not under unfavorable circumstances, but during long periods of time, say five, fifteen, or twenty years."

Nervousness or disagreeable mental emotions, or mental pre-occupation, will sometimes produce a temporary impotence. Dr. Hollick relates the case of a young business man of twenty-eight years of age, who had one child and an affectionate wife, of whom he was very fond. He met with business reverses, which caused him great anxiety and distress for some time, and amongst his other troubles he found himself perfectly impotent. He was in great alarm lest a general decay of vitality had begun, and hastened to consult the doctor. On learning that his circumstances were getting into better shape, and that he would probably soon be out of his difficulties, the doctor informed him that he would recover his powers again as soon as his anxiety was removed. And so it proved, for after some months of as perfect impotence as if the genitals had been completely removed, he became all right again.

Many business men have found that, during the season of the year when they are most oppressed with business cares, they have not the slightest inclination to sexual intercourse, and are to all intents and purposes impotent for the time being.

A remarkable case of virtual temporary impotence is that of a celebrated mathematician, who, as soon as copulation had begun, or just before, invariably had some problem in mathematics present itself to his mind, and, though sexually quite perfect, he regularly failed to perform the act. His wife at last, by a certain stratagem (dosing him with champagne at the doctor's suggestion) managed to cure him for one night of his mental pre-occupation, and he became the father of her child.

Persons deeply absorbed in study are sometimes in effect impotent. Such a case was that of Sir Isaac Newton, who, though sexually perfect, it is said never experienced sexual desire, his all engrossing studies quite unsexing him. Sometimes the extreme

coldness arising from severe mental toil can be remedied by a little judiciously administered Aphrodisiac medicine, which should, however, be taken only under the advice of a reliable physician.

Real permanent impotence is happily of very rare occurrence in early or middle life; and that which arises from old age may be in most cases postponed almost indefinitely by a course of life such as is recommended in Chapter XXIII.; but when the impotence of old age does really come, it is, of course, incurable.

The impotence arising from absence or malformation of the penis is treated of on page 90 and following pages of this book, together with the means adopted to remedy the defect when it is remediable. As will appear from a perusal of that article, the most astonishing cures of what would appear at first sight to be absolute and incurable impotency, may in many cases be worked by very simple means.

The cases also of incapacity of the penis to erect itself may usually, indeed almost invariably, be cured, unless the tissues are quite broken up and destroyed, so that the cells and blood-vessels of the erectile tissue are quite incapable of holding the blood forced into them. The methods adopted in such cases are fully set out on pages 92 to 101. Dr. Napheys also recommends the use in such cases of *electricity*, and a mild preparation of phosphorus, called "Phosphoric Acid Lemonade." Where there is any irritation or inflammation both these remedies are unsuitable, indeed highly injurious, but in cases of pure debility they may often be used with good effect.

The *electricity* should first be applied by a medical man skilled and *experienced in its use*. The patient may learn from him how to apply it for himself. The "Phosphoric Acid Lemonade" is about the only preparation of phosphorus which can be used by the patient himself with safety, and even it must be used with caution. The most frighful cases of Priapism and Satyriasis have been caused by its injudicious use, sometimes ending in death. (Priapism may be defined as a persistent and unreducible state of erection; Satyriasis is such an erection, coupled with an insane desire for sexual intercourse).

The formula given for the Phosphoric Acid Lemonade is:

Dilute phosphoric acid, -	fifteen drops.
Syrup of ginger, -	a tablespoonful.
Water, - -	a tumblerful.

This makes a pleasant drink and may be taken three times a day, *but not oftener;* nor should the quantity of the acid on any account be increased.

Dr Hollick speaks in the highest terms of the Cannabis Indica, or Indian Hemp, as a remedy for coldness of sexual temperament, but it should only be used on the advice of a physician.

This coldness or lethargy may arise from various causes. Depletion of the powers by either excessive intercourse with the other sex, or by solitary vice may cause a want of desire afterwards; on the other hand, a prolonged and strict continence may produce the same result. Alcoholic liquors, though they excite the sexual passions at first, eventually lessen or destroy them entirely. Gluttony does the same, as does also a poor and meagre diet, though good temperate living, such as will keep the body in the best health, prolongs the virile power. Loss of sleep, severe study, the engrossing cares of business, mental disturbances as sorrow, anxiety, fear, etc., the habitual use of various drugs as morphia, opium, chloral, arsenic, etc., the abuse of tobacco, may all destroy the sexual desires.

Certain diseases of the organs, especially gonorrhœa and syphilis, but also others such as diabetes, not arising from impurity of life, are frequent causes of impotence.

Excess of fat is often responsible for absence of feeling, as has been well known even from ancient times. Even young men are sometimes totally devoid of desire from this cause. The remedy for this is obvious—reduce the fat by severe exercise, or by the "Banting" system. Says Dr. Dancel: "I have never failed to observe that a man, not yet old, who is delivered by a judicious diet of even twelve or fifteen pounds weight, is astonished at the advantageous change which has taken place in his virile powers since he has commenced to grow thinner."

Various poisonous drugs not intentionally taken may also destroy the virility. Lead and arsenic are sometimes offenders in this way. Sometimes a slight and unknown and unnoticed acidity in the water coming through bad pipes will corrode and dissolve them to such an extent as to impregnate the water with poisonous lead. Most hair dyes, too, contain sugar of lead, and are injurious in consequence. Arsenic, too, is now so commonly used in the arts that there is more or less danger of accidental poisoning. Many cases of sore eyes have been traced to the

arsenical green coloring matter in wall-paper, and doubtless it in such cases also adds its quota to promote impotency. Incapacity, temporary or permanent, sometimes arises from self-abuse, though there is no doubt that the frequency of such results from that cause are often over-estimated. Persons with quack nostrums to sell delight to work on the guilty fears of those who practice or have practiced this solitary vice, and many popular medical books are not altogether blameless; for the diminished power of the devotee of masturbation is often increased to temporary impotence by what he reads in them. This subject will be more fully dealt with in a later chapter.

Spermatorrhœa, or persistent and frequent loss of semen, is, if allowed to go unchecked, likely to result in impotence; but the impotence is due to the debility and not directly to the seminal losses, and is seldom permanent. The remedy is to cease from the evil habits which caused it, to take a course of tonic medicines and treatment under medical advice, and to do generally that which will tend to restore the strength.

Impotency of one party at the time of marriage is ground in law for a declaration at suit of the other party, that the marriage was null and void from the beginning. But the impotent party cannot himself maintain an action for such a declaration.

STERILITY—MALE.

The most usual cause of sterility, when unaccompanied by inability to copulate, is the absence of the spermatozoa in the semen. Sometimes, indeed, there is no semen whatever produced, but this condition without impotence is rare. The other cause of sterility is, however, by no means unusual. In fact, it is a very common though by no means invariable result of the venereal diseases—syphilis and gonorrhœa or clap—that the semen is void of the living germs. This condition may continue for a long time before the power of erection and copulation is lost, but usually sterility arising from this cause is soon followed, indeed it is often preceded, by incapacity to perform the sexual act. Sterility arising from venereal disease is very apt to be incurable. Sometimes where sterility is caused by the use of tobacco, opium or other drug, the spermatozoa are, in the earlier stages, not absent, but dead. In such cases, by discontinuing the baneful practice which destroyed them, and giving proper atten-

tion to the general health, the patient may fairly hope for complete recovery. But in those cases where there are no spermatozoa because the testicles are seriously impaired, and especially where those organs have begun to waste away, the fountains of sexual life are broken up, and in most cases the man had better content himself with making the most of himself and abandon the hope of posterity.

Self-abuse, or excessive sexual indulgence, either lawful or unlawful, or spermatorrhœa arising from these causes or otherwise, even though causing impotence, is seldom accompanied by any diminution of the fecundating power in the semen, though of course the offspring might be expected to be weak.

The virtual sterility arising from inability to copulate, as from the congenital absence of a penis of sufficient length, or its loss through accident or by surgical operation, is not inconsistent with real fertility, for in such cases it often happens that there is a full or even abundant flow of semen of perfect fecundating quality, and sterility only exists because that semen cannot be brought into communication with the ovum of the female. In other cases, while the penis is in most respects perfectly formed and capable of erection and coition, the urethra, through which the semen should be carried to the forward end of the penis, opens instead on the lower side of the penis near its root, so that the semen is not thrown into the vagina at all, or is left so near its mouth that it is very unlikely to reach and impregnate the ovum. This condition is called Hypospadias. In some such cases, however, there is a groove from the hypospadic opening, along the lower side, down to the glans penis, and in some such cases, where the flow of semen is very strong and abundant, and the pressure of the vagina upon the male organ very firm, the posterior wall of the vagina forms a third side to the groove and completes it into a tubular form sufficient to carry the semen forward to the womb and produce conception. There is another peculiar and very rare condition in which, though there is an abundant supply of perfect semen, and the power of erection and copulation are present with the usual sexual excitement, yet from lack of sensitiveness in the glans penis, or from some other reason, the semen is never emitted during copulation, though it passes away afterwards during sleep, in the fictitious intercourse of lascivious dreams, with the same forcible ejection which ought to have accompanied the waking

act of copulation. Various remedies are proposed by medical men for this state of affairs. A mild electric current is believed by some to be a probable remedy, and doubtless it is worth trying; and Dr. Quain says that he has tried rubbing the end of the glans with a mild solution of the tincture of cantharides, to increase its sensitiveness, though he does not go on to state that it produced any beneficial effect. Neither have I been able to learn of any case in which either the electric current or the usual aphrodisiac remedies have affected a cure. Possibly any of these might do so in some cases, but the subjects for experiment are so rarely met with that opportunity for proving these remedies can seldom be had.

In all these cases where a wife, apparently sexually perfect, goes childless by a husband also seemingly sexually capable, the semen should be examined microscopically to ascertain whether the defect lies in him. And in probably fifty cases out of a hundred it will be found that the semen has no spermatoza in it, and is, therefore, incapable of producing conception.

But wherever there is semen produced which is of the perfect fecundating quality, even though small in quantity, but by reason of some of the defects mentioned it cannot be introduced into the female vagina or womb in the ordinary natural way, the husband and wife, if they really wish for children, need by no means despair. It has been proven by many experiments that the presence of the male organ within the female is not at all necessary to produce conception; and, with a proper, fertile semen, conception may and often has been produced by artificial means. In some cases it has been caught in a warm spoon as it passed from the man, and was then placed as far up the vagina as possible, with the desired result. A still more effectual way is to catch the semen in a warm common glass "female" syringe, such as women use for simple injections, and with that to inject it far up into the vagina, or, surer still, press its end, which is perfectly smooth round glass, lightly against the mouth of the womb itself, and inject it forcibly into that organ. A fair degree of vigor in the injection need not be feared, as the force of natural ejaculation from the penis is sufficient to cast the semen several feet.

The use of such means is undoubtedly perfectly justifiable. It is in no way a violation of nature, but assists her in carrying

out her plans in those cases in which she has herself made inadequate provision for doing so.

Barrenness in either party is no impediment to a valid marriage, if the power of copulation be present. But the question is often asked, ought a man or woman, who is sterile, to marry at all? To this question I would say that if sterility undoubtedly exist, no marriage should take place, unless the other party is aware of the defect and still desires it. If there be any occasion for doubt of fertility, the doubt should be cleared up, as far as it may be by proper investigation; or the sterility, if curable, should be cured before marriage should be thought of. Where there is not an absolute breakdown of the sexual organs and no organic disease exists, but the sterility depends upon a deficient secretion of semen, there may be a very fair chance of improvement. Often a change of climate, by improving the general health and the condition of the nervous system by the exhilarating influence of novelty, will do a great deal. So will tonic medicines and a proper attention to diet. And the use of electricity is by many believed to be most important and valuable of all these remedies.

Says Dr. Julius Althaus: "It is not unreasonable to expect that the secretion of semen may be restored when lost, or improved when deficient, by the use of galvanism. A deficient secretion of milk in the breast of a female, or cerumen in the ears, or nasal mucus, and of saliva, may be stimulated by the application of electricity. The same effect may naturally be looked for by acting with the continuous current upon the secretory glands of the semen."

This unquestionably valuable curative agent is, however, dangerous in ignorant hands, and should only be used under the advice and direction of a physician *skilled in its use*.

As to the various so-called "electric suspensories" and "electric belts" which are so extensively advertised for sale, we have only to say that, in our opinion in most cases, money spent for them will be found to be wasted, however fetching, seductive and confident the advertisement may be.

No man has a right to condemn a woman to childlessness. Every properly-constituted young woman desires children. Her maternal instincts cry out for one on whom to expend her mother love, and a childless wife is often, of all women, the most miserable, not only in the deprivation itself, but because she frequently

incurs from those about her that pity which of all pity she cannot endure, for she thinks it a reproach To most married men, too, the lack of someone to bear their name, or transmit their blood to future ages, is a grievous misfortune. And a woman has no right to marry who has cause to believe herself incapable of producing that crown of marriage for which the institution of marriage was particularly ordained, and to deprive a man, unless with his knowledge and consent, of the opportunity of becoming the father of legitimate offspring.

Of course, when the woman is at any rate past the age of child-bearing, the mere sterility of either party without impotence should form no obstacle to marriage.

CHAPTER XXV.

IMPOTENCE AND STERILITY: FEMALE.

THE same general remarks which were made in Chapter XXIV., on "Impotence and Sterility in the Male," also apply in a qualified degree to a similar condition in women. But the fact that in nearly every case of a childless married pair, the defect is attributed in the public mind to the wife, makes the condition of the barren woman easier to endure, because it is supposed to be so common; while on the other hand, when impotence or sterility is actually brought home to the man, it is the more damaging to his feelings because so few men are even so suspected by their neighbors.

Nevertheless, from the earliest records of the human race down to the present time, the instinct of motherhood has made women desire to have children, and they have instinctively either pitied or despised, according to the bent of their mind, the woman "whose womb God has shut up," and barrenness has in many ages and countries been esteemed by the woman herself a worse affliction than even death; and many a woman has gloried in and praised God for the child to bear whom she even gave up her own life, because "her reproach was taken away." The story of Jephthah's daughter (Judges xi., 30-40) is instructive. When this young virgin, in fulfilment of her father's foolish vow, was about to be slain and offered up for a burnt offering, she asked and obtained leave to go with her companions into the mountains for two months, to bewail, not her approaching death, but the fact that she must die *childless*. This instinct is so universal that every properly constituted woman desires to have at least *one* child, to prove to the rest of womankind that she can, even though she is unwilling to so far subordinate her social pleasures to her parental instinct as to produce another. For this reason the reproach sometimes cast upon a childless wife, that she is avoiding conception, is one we may fairly say *never* deserved; and the contemptuous manner in which many women deride others for their childlessness is as cruel as it is uncalled for. Even an unnecessary reference to the fact, or a well-meant attempt at expressing

sympathy, is very liable to give pain, and the kindest thing her friends can do in the matter is to make no sort of reference to it.

This childless condition of the married woman may arise from impotence or sterility on the husband's part, as described in Chapter XXIV., but if not, then it may arise from either of these conditions in the woman herself.

IMPOTENCE—FEMALE.

Impotence consists in inability to receive the male organ. The cause sometimes is an inordinate tenderness in the vulva, or opening leading to the vagina, such that the attempt at coition causes unendurable pain. A woman who is thus afflicted need not on that account go childless. The formation of the ova may go on and menstruation take place in the normal manner, and if so she is capable of impregnation. A celebrated physician relates a case of this kind. The husband consulted him in regard to the condition of his wife. They had been married for a few months, but had never been able to have connection, the wife complaining that the attempt hurt her too much. The physician made an examination and found the external genitals acutely sensitive and the hymen unbroken, but *the woman several months gone in pregnancy.* In the attempt at connection, semen had been cast into the vagina merely through the small opening in the hymen, and conception had taken place. Of course, such a hyper-sensitive condition can usually be remedied by proper medical treatment, and even if it fail, conception may be brought about as above described, or by injecting the semen with a small syringe, as described in Chapter XXIV.

In some cases impotency is caused by some malformation of the vagina, as where it is too small; but most cases of this sort are in a greater or less measure curable by the physician or surgeon; the too small vagina may be stretched, or improper growths removed. Sometimes the entrance to the vagina is closed by a hymen so strong that the male organ is unable to rupture it; this can be remedied by the surgeon's knife without danger. In other cases the labia are grown together by reason of some neglected inflammatory condition or the like; this can be corrected in like manner.

Indeed, cases of real, incurable impotence, such as the absence of a vagina, are very rare. And if there be a vagina into

which the male organ of copulation can penetrate, even though the womb and ovaries are absent or rudimentary, there is no impotence in the strict sense of the word, and a marriage would probably be valid in law, whether or not it would be justifiable in morals. This question of the moral justification of marriage under such circumstances is discussed in Chapter XXIV.

STERILITY—FEMALE.

Sterility in women is the inability to conceive children. Virtual sterility may exist by reason of incapacity for sexual intercourse, but usually arises from other causes. There may be some obstacle to the entrance of the seminal fluid, or the spermatozoa, into the womb; a displacement of the womb, whereby its mouth is turned backward against the wall of the vagina, will have this effect; so, of course, will any closure of the mouth of the womb.

The ovaries may be diseased, or rudimentary, or may be absent entirely, either from the time of birth, or having been removed by surgical operation. In these cases there will be no ova in which impregnation can take place. In cases of the congenital absence, or of the non-development of the ovaries, the womb, too, will either be wanting, or merely rudimentary.

There may be a perfect womb, and ovaries maturing perfect ova, but there may be some defect or closure of the Fallopian Tubes, so that the egg and the spermatozoa of the semen cannot reach each other. Again, through some defect in the womb, the fecundated ovum, on reaching it, may never be able to find a lodgment, and will regularly pass out without ever developing, or there may be inflammation in the womb which will kill the spermatoza, or the ova, on their being brought into contact with it.

In all these cases, of course, no conception can take place, and the woman is sterile, but in many of them the cause may be removed by proper medical treatment, and no woman should go childless without having her case investigated by a competent physician; and, if necessary, the husband should do likewise.

CHAPTER XXVI.

SEMINAL EMISSIONS.

(SPERMATORRHŒA.)

THERE is no other subject on which men are so sensitive as on that of their sexual condition; and many men face death itself with greater equanimity than they would face the loss of sexual power withal. Dr. Remondino tells of a man whom he knew in the rough early days of boating on the Mississippi River, who was a perfect terror to all the fighting men on the river. He was not a large man, nor particularly muscular, but he got the reputation of being able in a fight to seize his opponent's privates, and, by one squeeze, to destroy their vitality and render the man sterile; the consequence was that men would rather face a battery of artillery, or sleep in a small-pox hospital, than get into a combat with him. A very trifling ailment of the private parts is sure to cause the greatest alarm.

This fact is taken advantage of by unscrupulous persons to torture the imagination of young men by describing a common physiological fact as evidence of disease, in order to get money out of them by the sale of supposed remedies. That this business must bring in enormous sums of money may well be guessed from the multitude of costly advertisements which are used to call attention to their wares, all of which their dupes pay for.

The alleged disease which seems to be a chief object of these gentlemen's solicitude is that symptom now well-known to even laymen by the name of Spermatorrhœa, or Seminal Losses or Emissions.

This means a loss or expulsion of semen without voluntary sexual excitement; and we may say that if the actual facts concerning this function were generally known, the business of these advertising gentlemen would suffer serious diminution.

We may clear the ground at the outset by stating that this loss of semen, occurring during sleep with libidinous dreams, or while at stool, or when the passions are greatly excited, is not necessarily or usually a symptom of any impaired condition. On the contrary, if not too frequent, these emissions are an evidence rather of sexual health. The testicles of the adult male are all

the time, but particularly upon any sexual excitement, secreting semen. This passes up and is stored in the seminal vesicles, at the base of the bladder; and as the capacity of these reservoirs is limited, it must pass away again. A certain amount of it is perhaps absorbed, but the abundant secretion of early manhood, unless spent in sexual intercourse, must come away in seminal emissions, and under these circumstances it is as natural for the seminal vesicles to empty themselves as for the bowels and bladder to do so. It may be stated in general terms that if these emissions do not occur oftener than once or twice or three times a week, they are, in early manhood especially, quite natural and proper. Indeed, perfect health is often found where these emissions take place even daily.

Nevertheless, many young men, reading the terrifying list of symptoms found in these advertising pamphlets and in newspaper advertisements, become melancholy and debilitated, with poor appetites, disturbed rest, wandering minds, etc., etc., all which are caused, not by disease, but by reading and brooding over the list of symptoms, and imagining they can notice them all in their own cases. They are much like the hero in Jerome K. Jerome's "Three Men in a Boat," who fell to reading a "doctor book," and, from studying the symptoms carefully, soon convinced himself that he had all the diseases there described, except "housemaid's knee," and felt quite hurt because he had not that too.

The real *disease* Spermatorrhœa is *very rare*. We shall avoid giving any list of symptoms, as the result might be just such as we have outlined above, to produce them in the patient's imagination, but will content ourselves with saying that if a man appear to have any considerable seminal losses, and at the same time feels his health running down, the only wise thing to do is to go to some physician in whom he has confidence, state his case frankly and act on the physician's advice, and he need give his own mind no worry over it whatever. At the same time such a disease unquestionably exists, and, where it does exist, is undoubtedly very injurious to health and happiness, and we think proper, for that reason, to give warning against those causes which produce it.

Causes. There is no other cause which produces so many cases of spermatorrhœa as self-abuse. Indeed, the majority of all cases of this disease spring from it; and the worst of these cases

is that they are unusually difficult of cure. Why? Because the patient is very likely the helpless, hopeless slave of this vile habit; he has lost his nerve, his power of even strongly willing to give up the practice which is destroying him In many cases nothing short of a surgical operation, removing the testicles completely, will stop him. This is sometimes really resorted to, where it becomes a matter of choice between eunichism on the one hand, or insanity or death on the other.

Excessive indulgence in sexual intercourse may also cause this disease, though it is much less likely to than the solitary vice, because the solitary vice can be and is practiced at all hours and under all circumstances, and the losses and consequent drain on the nervous system are just so much greater. This ruinous indulgence is almost equally harmful if taken in illicit amours, or in the lawful embraces of the conjugal bed; but it is much more likely to occur with the unmarried, because they are more apt to yield to excess when opportunity occurs, on account of their long restraint. It is not to be supposed that it always requires a long course of excess to produce this evil; the unbridled passion of a single night may so wreck the nervous system that the disease is set up at once. This is peculiarly liable to happen to those men who are past the vigor of their earlier prime; and the wretched old bachelors who wreck their health in this way are far from few.

Another cause to which also the unmarried are more liable is venereal disease, the after consequences of which, unless the disease has received prompt and skilful attention, is apt to be a weakness of the genital organs, with incontinence of the semen.

The frequent excitation of the passions by lascivious thoughts, obscene stories, impure imaginations and otherwise, is another cause of spermatorrhœa, akin in its character to masturbation, the solitary vice.

But this lamentable disease may arise from causes entirely unassociated with disgraceful habits or debased mind, and reflecting little or no blame whatever on the unfortunate sufferer. Excessive mental labor with neglect of proper exercise and attention to bodily needs, habitual constipation, long-continued diarrhœa, the irritation caused by certain diseases of the skin, or by the accumulation of sebaceous matter under the foreskin, the excessive use of alcoholic liquors, coffee or tobacco, ulcers or worms in the lower bowel, stone in the bladder, inflammation of the parts from various

causes—any of them may cause this disorder. There may even be an inherited tendency to this disease. The wise physician is perfectly aware of these things, and is very unlikely to wrongfully suspect the young man of being the victim of his own wrong-doing, who, fearing himself a sufferer from this disease, goes and lays his case plainly and candidly before him; and even if it be true that his own vices are thus finding him out, it is still the wisest thing he can do to make a clean breast of the whole matter, for his secret is safe with any reputable physician, who will not even despise him, for he knows that the wrong was probably done in ignorance, and the sufferer can only expect intelligent advice and treatment if his adviser be informed of all the facts.

One other not infrequent cause of seminal emissions amounting to disease, is *long engagements*. The caresses and fondlings in which the engaged young man is almost sure to indulge, inevitably excite his passions violently, and the result is extraordinary activity of the semen-secreting function. This is almost sure to bring with it nocturnal emissions and a weakening of the sexual power, coupled eventually with spermatorrhœa, so that by the time the marriage has taken place, when the man should be in possession of the fullest sexual vigor, he finds himself with powers quite impaired, or even impotent. Especially is this liable to occur with those who, earlier in life, have been addicted to sexual excess, or to the solitary vice.

We know that advice to have marriage follow pretty closely upon the heels of the engagement, unless the parties live a so great a distance from each other as to prevent frequent visits, or to forego those loving toyings and fondlings which are so pleasant to them, is almost sure to be disregarded in practice, however its justice may be approved in the abstract, but we cannot forbear to give warning, that the frequent excitement of ungratified passion which results from such a course, is sure to be visited with greater or less punishment.

Mr. William Acton, the eminent surgeon, says: "All medical experience proves that for anyone, especially a young man, to enter into a long engagement without any immediate hope of fulfiling it, is physically an almost unmitigated evil. I have reason to know that this condition of almost constant excitement has often caused not only dangerously frequent and long-continued nocturnal emissions, but most painful affections of the testes.

These results sometimes follow the progress of an ordinary two or three months' courtship to an alarming extent. The danger and distress may be much more serious when the marriage is postponed for years."

Prevention and Cure. The course of life necessary to prevent Spermatorrhœa is indicated in describing its causes. Lead a pure life. If married, indulge in moderation, not every night, much less several times in one night. If unmarried, lead a chaste life, chaste in body and mind. Avoid impure thoughts and lustful imaginations, licentious reading and conversation, and everything which excites the sexual passion. Lead as quiet a life as circumstances will permit, but pure and agreeable society is far better than solitary brooding.

Even a natural weakness and predisposition to this trouble can be largely or quite overcome by observance of these recommendations and by attention to hygienic conditions, cleanliness of the parts, cold bathing, regular exercise, and a wholesome, nutritious, but unstimulating diet. All those foods, relishes, spices, condiments, drugs and medicines which are described as sexual excitants, in the chapter on "The Hygiene of Virility," should be avoided.

Sleeping on a soft feather bed is also provocative of emissions. A mattress of hair or other moderately hard mattress is best. The covering, too, should be light and not too warm, the air pure and the room well ventilated. Care should also be taken to empty the bladder just before retiring. The pressure of a full bladder on the seminal vesicles is very apt to cause emissions. Most persons who are so troubled find them occur well on towards morning, when the bladder has got pretty well filled up again. In such cases one may sometimes find it prudent to set an alarm clock to awaken him about an hour before the time when the trouble usually occurs; if he get up then and empty the bladder again, he will likely escape the trouble for that night. Sleeping lying on the back is also liable to cause emissions. The reason for this is similar to the reason last given; the seminal vesicles, which are the reservoirs for the semen, lie along the base, or back lower side of the bladder, and lying on the back causes the weight of the bladder to press upon them, provoking sexual excitation and emissions. To get rid of a habit of sleeping on the back, it is sometimes necessary to adopt some mechanical means, such as

tying a towel round the body, with a large knot just over the spine.

Many a patient who is afflicted with these losses, and at the same time with weakness, nervousness and debility, imagines the losses to cause the other troubles, when really they are the result, not the cause. Then, any treatment which will build up and give tone to the system, well-regulated diet and exercise, plenty of sleep, tonic medicines and whatever will improve the general health, is at the same time certain to cure those frequent cases of nightly losses arising from weak health.

A cold bath taken before retiring is a useful preventative. A rather heroic treatment in connection with this is to pour a stream of cold water down the spine for a few minutes.

A simple and effective means of preventing erections is described by Dr. Wood. It was used by him in two cases, one a very obstinate one, with perfect success. Says the doctor: "I took a strip of isinglass adhesive plaster, two inches long by half an inch wide, moistened it and applied it along the back of the member. It worked like a charm, and the young man has not been troubled since, when the plaster is on. He is now entirely recovered and at work at his trade.

CHAPTER XXVII.

THE SOLITARY VICE.

THIS habit, otherwise known as Masturbation (Latin—*Masturbatio*, probably from *manus*, the hand, and *stupro*, pollute), or Self-abuse, requires more than the occasional reference it has received from time to time throughout this book; partly because its prevalence and injurious consequences are under-estimated by many, and partly because they are exaggerated by many more.

Fowler defines this degrading vice as "Indulging immodest feelings and actions, and imagining sexual pleasures with one of the opposite sex, whilst handling your own private parts." He says: "Masturbation outrages Nature's sexual ordinances more than any or all the other forms of sexual sin man can perpetrate. . . . . It is man's sin of sins, and vice of vices; and has caused incomparably more sexual dilapidation, paralysis and disease, as well as demoralization, than all other sexual depravities combined. Neither Christendom nor heathendom suffers any evil at all to compare with this; because of its universality, and its terribly fatal ravages on body and mind; and because it attacks the young idols of our hearts, and hopes of our future years."

Sir James Paget, the eminent English Surgeon, takes a somewhat less gloomy view of the matter. In addressing a class of physicians and students in a London hospital, he said: "But on some subjects your teaching will have to be very clear as to matters of fact; especially, for instance, as to the practice of masturbation, to which many of your patients will ascribe their chief distress

"Now, I believe you may teach positively that masturbation does neither more nor less harm than intercourse practiced with the same frequency, in the same conditions of general health, age and circumstances. Practiced frequently by the very young, that is, at any time before or at the beginning of puberty, masturbation is very likely to produce exhaustion, effiminacy, over-sensitiveness and nervousness; just as equally frequent intercourse at the same age would probably produce them. Or, practiced every day, or several times a day, either act is likely to produce such

symptoms. And the mischiefs are likely or nearly sure to happen, and to be greatest, if the excesses are practiced by those who, by inheritance or circumstances, are liable to any nervous disease, to spinal irritation, epilepsy, insanity, or any other.

"But the mischiefs are due to the quantity, not to the nature of the excesses; and the quantity is to be estimated in relation to the age and power of the nervous system. I have seen as numerous and as great evils consequent upon excessive intercourse as upon excessive masturbation; but I have not seen or heard anything to make me believe that the occasional practice of this latter vice has any other effects on one who practices it than has occasional intercourse. I wish I could say something worse of so nasty a practice; an uncleanliness, a filthiness forbidden by God, an unmanliness despised by men."

Dr. Napheys, who quotes the foregoing opinion of Sir James Paget, while not just prepared to differ from it in any particular, goes on to say: "While so much of this opinion will be generally acknowledged to be true as asserts that the occasional indulgence in this detestable habit may not leave after it those permanent effects which the quacks pretend, and the dread of which drives so many to despair; on the other hand, it has been abundantly shown that there is in the habit itself a peculiar and distressing wear on the nervous system, which leaves most serious traces for a long time.

"It has, for instance, been demonstrated by Professor Gross, of Philadelphia, that a variety of *stricture* is brought on by masturbation, which may in turn lead to most serious consequences. These are, in the milder forms, undue sensitiveness of the urethra, with slight inflammation along its tract, and the erections become imperfect and feeble, and ejaculation too precipitate. This may continue until sexual desire is abolished, and a condition of hypochrondia sets in with all those difficult features which we have previously described.

"There are, moreover, other very serious differences between intercourse and solitary vice. The temptation to carry the latter to excess is far greater than is the case with the former; and the excitations, abnormal and excessive, which are encouraged to provoke it, cannot but have a long-continued disastrous influence.

"Another grave charge is its prevalence in early, we may say very early, life. Even in infants it is not unknown, and should

be carefully watched for. An able American writer on diseases of children, Dr. Jacobi, has recently called special attention to this subject. He points out that young children may be prompted to it by some condition of the urine, by the presence of seat-worms, or by acquired nervous derangements, as well as by the vicious instruction of those around them."

Dr. W. T. Belfield, of New York, Professor of Secret and Urinary Diseases in the College of Physicians and Surgeons there, supports the opinion of Sir James Paget; in fact, he thinks that, act for act, sexual intercourse is more exhausting than masturbation, and that the more common evil effects of masturbation arise from the greater facility, and correspondingly greater frequency, and the earlier age at which it is practiced. Professor Belfield says: "There is no denying the fact that this custom is alarmingly prevalent among children of both sexes Parents cannot be too careful in supervising the habits of their children, for these often acquire the habit of self-pollution without knowing what they do. In fact, the habit is practiced, in many instances, at an age when the child would not be supposed to be deriving any gratification from it. It has even been practiced by infants in arms. Every association of boys or girls, such as occurs in boarding schools, public schools, and the like, is a hot-bed for the propagation and dissemination of this habit among innocent children. Every child who is entrusted to the care of hired servants also runs a risk of contamination. This is, of course, a matter for parents, guardians and teachers of children to detect and to prevent; it lies beyond the reach of the physician.

"A few words of information may, however, be comforting and profitable to parents who discover that their children have been taught this habit.

"In the first place, the evils which are popularly attributed to the habit are grossly exaggerated. The medical profession has been singularly lax in instructing the people as to the actual facts in the case; hence the popular information on the subject is derived from quacks, whose interest is furthered by exciting the fears and anxiety of those who have at some time been guilty of the practice. From such sources people have derived the belief that one who has been addicted to self-abuse is marked as a victim for all sorts of nervous diseases, terminating in insanity, imbecility, and death. These ideas are essentially erroneous;

for no instance is on record in which insanity or imbecility could be traced positively to this habit. The numerous cases in which self-abuse is practiced by insane, imbecile and epileptic patients seem to be instances in which both the disease and the habit of self-pollution are the results of a common weakness of the nervous system, and not that either one is the effect of the other.

"The injury which is to be expected from indulgence in the habit of masturbation depends largely upon the extent to which the habit is practiced, as well as the age at which it was begun. As has been stated, every healthy male suffers a discharge of seminal fluid at stated intervals, no matter how continent he may be; and the frequency of those emissions may vary extremely without exceeding the bounds of health, or causing injurious effects. The health of the individual is not impaired when the frequency of these emissions is much increased by marriage; nor is his general condition necessarily deteriorated if the emissions are made to occur without marriage. Injury is to be expected when the habit is acquired at an early age, before the sexual powers are developed, and hence before they are capable of sustaining the effort required of them in responding to the stimulation of sexual excitement. Unfortunately, in many cases, the boy becomes so addicted to the habit that he becomes incapable of thinking about or devoting his energies to anything else. The result must necessarily be a stinting of his intellectual powers. One other fact should be emphasized, namely, that the injury is simply the result of exhaustion of the vital powers; and that this exhaustion results, not from the loss of the seminal fluid, but from the *excitement* incident to the escape of the fluid. The most absurd and extravagant ideas prevail as to the vital importance of the male fluid; these ideas, derived chiefly from the advertisements of 'specialists,' ascribe to this fluid the qualities of a vital essence. It is a prevalent belief that the loss of a single drop of this fluid exhausts a man as much as the loss of a considerable quantity of blood. Such ideas are, of course, absurd; the exhaustion which follows the loss of the seminal fluid is consequent merely upon the intense excitement which accompanies the act. This is the most intense and exhausting emotion of which the human animal is capable; and indulgence in it is followed by a corresponding degree of exhaustion. As a matter of fact, a seminal emission, induced artificially, does not and cannot ex-

haust the individual so much as natural intercourse; but the trouble is that, while the number of emissions in the natural way is, from the nature of things, limited, there is no limit to the license which a person may practice, who gratifies his sexual appetite by artificial means. Hence, masturbation is, or may be, more injurious than sexual congress, simply because it is so easily and generally practiced to an excess that is impossible in natural intercourse."

Professor Belfield, while giving no invariable rules for the treatment of this habit, points out that the method of treating it must vary greatly in different cases. Where the child is pale and feeble, medical treatment and dietary attention which will improve his health will often enable him to overcome the habit of self-pollution. But in most cases the most effectual method is to engage the child's thoughts and energies constantly in employment or recreation which will absorb all his attention and employ all his vigor; and in instructing and encouraging him in overcoming the habit, treating him, not with harsh rebukes or violence, but with the warmest sympathy and support. The use of mechanical means, such as tying the hands and feet, is justifiable only as a last resort, and is seldom effectual. Such means should scarcely be adopted, except upon the advice of a responsible physician.

In those many cases in which the habit arose from the irritation caused by stricture of the foreskin, or by the accumulations of secretions under it, or by the various skin diseases and urinary troubles which may affect the parts, or by seat-worms, the first thing is, of course, to remove those causes by proper attention to the child's cleanliness of person, and by the appropriate medical treatment.

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CORRECTION.

For "prostrate gland" read "prostate gland" on pages 79, 83 and 87.

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